Award Number:
W81XWH-10-2-0178

TITLE:
Military Suicide Research Consortium

PRINCIPAL INVESTIGATOR:
Peter M. Gutierrez, Ph.D.

CONTRACTING ORGANIZATION: Denver Research Institute, Inc.
Denver, CO 80220

REPORT DATE:
October 2015

TYPE OF REPORT: Annual

PREPARED FOR: U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

DISTRIBUTION STATEMENT:

X Approved for public release; distribution unlimited

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
October 2015	Annual	28 Sept. 2014 – 27 Sept. 2015

4. TITLE AND SUBTITLE

Military Suicide Research Consortium (MSRC)

5a. CONTRACT NUMBER

5b. GRANT NUMBER
W81XWH-10-2-0178

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

Peter M. Gutierrez, Ph.D.

E-Mail: Peter.Gutierrez@va.gov

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Denver Research Institute, Inc.
1055 Clermont St. 151
Denver, Colorado 80220

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for Public Release; Distribution Unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

The fifth year of the MSRC included supporting a total of twenty-three MSRC funded projects, four postdoctoral pilot grants, and providing thirteen dissertation awards to expert and future leaders in the field of military suicide research. The Denver staff continues to collaborate with the Florida State University site and seek guidance from its senior advisors and the Military External Advisory Board. The MSRC is financially mindful in leveraging funds and reviewing its infrastructure to increase the funds available to support additional research. The MSRC was approved for a one-year No Cost Extension. The MSRC has been approved for grant funding, to establish new research priorities and extend its scope.

15. SUBJECT TERMS

- Funding research projects
- Establishing pre-doctoral and postdoctoral training
- Leveraging funds
- Collaboration with Cores

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			USAMRMC
U	U	U	UU	185	19b. TELEPHONE NUMBER *(include area code)*

Annual Report to Department of Defense

(Fiscal Year 2015: September 28, 2014-September 27, 2015)

"Military Suicide Research Consortium"

DoD Award: W81XWH-10-2-0178

Table of Contents:

Introduction:

The Military Suicide Research Consortium's ultimate goal is suicide prevention in the military, through research, including on primary, secondary, and tertiary interventions, as well as through information management/scientific communications (cataloguing and disseminating knowledge on military suicide). Specifically, suicidal personnel compromise force readiness, place a strain on the healthcare resources of the military, impact unit morale, and take a large emotional toll on the involved friends, family, and commanders. There is significant stigma associated with being suicidal, which limits the extent to which at-risk individuals are willing to seek help. Moreover, decision-makers need a go-to resource for accurate, efficient, and fast answers regarding suicidal behavior as policies and programs are developed. The Military Suicide Research Consortium is designed to facilitate information management/scientific communications for the DoD and to maximize research efforts at understanding and improving suicide risk screening and assessment, interventions, and population-level prevention programs, as well as to address other pressing research needs (e.g., basic research including neuroscientific and genetic approaches). Programs and projects conducted by the Consortium ensure that information management/scientific communications occur seamlessly, and that screening and assessment, intervention, and prevention efforts are based on the best possible scientific evidence, specific to military personnel. Further, the Consortium contributes to the goal of the research program by expanding our knowledge, understanding, and capacity to prevent, treat, and enhance the quality of life of persons in military communities and the general public who are affected by suicide-related problems.

The Consortium's overall mission can be summarized as follows; each function is developed with the goal of clear military relevance:

1. Produce new scientific knowledge about suicidal behavior in the military that will improve mental health outcomes for our men and women in uniform.

2. Use high quality research methods and analyses to address problems in policy and practice that will have a direct impact on suicide-related and other mental health outcomes for military personnel.

3. Disseminate Consortium knowledge, information, and findings through a variety of methods appropriate for decision makers, practitioners, and others who are accountable for ensuring the mental health of military personnel. This includes a rapid response function so that queries from decision makers and others to the Consortium are answered with speed and efficiency. Technical assistance and support for decision makers and others is an integral aspect of this Consortium function. This aspect of the Consortium warehouses knowledge about suicidal behavior in general (e.g., from civilian and international sources as well as from military sources), so that military issues can be informed in a comprehensive manner.

4. Train future leaders in military suicide research through experience within a multi-disciplinary setting for Ph.D. students and postdoctoral scholars interested in research questions on military suicide of both a basic and applied nature.

The inter-relations and flow of information between the Cores and the research program is an important component of the Consortium. By its nature, the Executive Management Core, Core A, is involved with all other Cores and the research program, to exert leadership and quality control over them. In its capacity as our knowledge warehouse/ communication center, the Information Management/Scientific Communications Core (Core B) receives input from all elements of the Consortium, and outputs information to military decision makers and others in rapid and efficient fashion. The Database Management/Statistical Core, Core C, represents a highly valuable asset to the Consortium as a whole, perhaps particularly to the research program. Core C provides world-class data management and analysis infrastructure and consulting.

Body:

Statement of Work

Task 1. Project Start-up (months 1-3)

1a. Create infrastructure for all Cores (month 1)

- Core A and Core Directors have bi-monthly conference calls to discuss the Consortium, including its infrastructure.
- Core A and Core B research assistants developed the Consortium's Standard Operating Procedures (SOP; Started in August 2010, received MOMRP legal approval in February 2011). There have been three versions of the SOP; the most recent version was approved April 2012.

1b. Hire and train staff (month 2)

- Denver staff were hired and trained by August 2010, with pre-award funding approval.
- The MSRC reviewed its infrastructure and merged The Military/Civilian Research Monitoring Core with the Information Management/Scientific Communications Core, referred to as Core B. Originally Core D, The Database Management/Statistical Core was renamed Core C with the infrastructure changes.
- Denver staff hired an IRB Coordinator in May 2012.

1c. Core B (Military/Civilian Research Monitoring research assistants) conduct first comprehensive literature review (month 3)

- Accomplished by month 3 and distributed results to Cores A and C.

Task 2. Plan research projects (months 4-9)

2a. Establish research priorities in consultation with External Advisory Board (month 4)

- Core A chose preliminary research priorities in month 3, while External Advisory Board members were selected.
- The Military External Advisory Board (MEAB) and Independent Scientific Peer Review Program (ISPRP) members were chosen by month 7.
- The MEAB and Core A met with funded research teams in June 2011, November 2011, May 2012, August 2012, and May 2013.
- The MEAB and Core met in May 2014 to review the research portfolio and discuss research gaps and goals.
- Core A reviews MEAB research priorities at regular MEAB, IPR, and MSRC meetings.

2b. Assemble research teams (months 5-6)

- Assembling MSRC funded research teams began in month 5 and completed in month 40, with the last MSRC project funded.

- There are 54 MSRC research members who receive information quarterly on the development of research within the MSRC.

2c. Continue creation of Core B infrastructure (months 4-9)

- Core B is co-located at the FSU site and the Denver site. Its infrastructure was enhanced in month 16, with the merging of the Cores.
- Core A contributed to the creation of Core B's infrastructure.

2c. Core A and Core B assist with protocol development and production (months 7-8)

- Core A and Core B collaborated on protocol development and production.
- Core A and Core C created a set of common data elements in collaboration with experts in the field of military and suicide.

2d. Core B review protocols to ensure proper military relevance (month 9)

- Core B reviewed all proposals ensuring military relevance.
- The MEAB also reviews protocols and ensures military relevance when research teams present proposals to the board.

Task 3. Implement intramural research projects (months 10-12)

3a. Preliminary study information submitted to Core B (month 12)

- Preliminary study information was submitted to Core B and added to the Consortium's website.
- Core B promotes research projects through multiple media venues and maintains the website on a daily basis.
- As of month 60, the MSRC Research Program has funded 23 research projects and 4 postdoctoral pilot grants. Six research projects and all four postdoctoral pilot grants are successfully complete.

Task 4. Initial Consortium review by External Advisory Board (month 12)

- The Military External Advisory Board (MEAB) met with Core A in June 2011 (month 9) and November 2011 (month 14).
- Core A reviews the progress of the Consortium with their senior advisors, the MEAB and MOMRP at annual meetings and regular conference calls.

Task 5. Preparing year one quarterly reports (months 3, 6, 9, 12)

- The 1st, 2nd, 3rd and 4th quarter reports were prepared and distributed on time.

Task 6. Continue intramural research projects (months 13-60)

- Denver Research Institute funds 12 research projects:
  - *Usability and Utility of a Virtual Hope Box for Reducing Suicidal Ideation*, Dr. Nigel Bush, National Center for Telehealth and Technology/Portland VAMC, $307,128 (Appendix 2)
  - *A Behavioral Sleep Intervention for Suicidal Behaviors in Military Veterans: A Randomized Controlled Study*, Dr. Rebecca Bernert, Stanford University/Palo Alto VAMC, $1,182,369 (Appendix 3)
  - *Suicide Bereavement in Military and their Families*, Dr. Julie Cerel, University of Kentucky, $672,989 (Appendix 4)
  - *Window to Hope: Evaluating a Psychological Treatment for Hopelessness among Veterans with TBI: A Phase II RCT and an Active Control Component*,

Drs. Lisa Brenner and Grahame Simpson, Denver VAMC, $986,789 (Appendix 5)
    - *Suicide Risk Assessments within Suicide-Specific Group Therapy Treatment for Veterans: A Pilot Study*, Drs. Lori Johnson and David Jobes, Robley Rex VAMC, $429,801 (Appendix 6)
    - *Toward a Gold Standard for Suicide Risk Assessment for Military Personnel*, Drs. Peter Gutierrez and Thomas Joiner, Denver VAMC/Florida State University, $2,852,189 (Appendix 7)
    - *Psychophysiology of Suicidal States*, Drs. Michael Allen and Theresa Hernández, Denver VAMC, $305,823 (Appendix 8)
    - *Neuroimaging Correlates of Suicide*, Drs. Deborah Yurgelun-Todd and Perry Renshaw, University of Utah Brain Institute/Salt Lake City VAMC, $755,096 (Appendix 9)
    - *A Novel Approach to Identifying Behavioral and Neural Markers of Active Suicidal Ideation: Effects of Cognitive and Emotional Stress on Working Memory in OEF/OIF/OND Veterans,* Drs. Melissa Amick and Beeta Homaifar, Boston VAMC/Denver VAMC, $648,313 (Appendix 10)
    - *Home-Based Mental Health Evaluation (HOME) to Assist Suicidal Veterans with the Transition from Inpatient to Outpatient Settings: A Multi-site Interventional Trial*, Dr. Bridget Matarazzo, Denver VAMC, $1,516,055 (Appendix 11)
    - *Effectiveness of a Virtual Hope Box Smartphone App in Enhancing Veteran's Coping with Suicidal Ideation: A Randomized Clinical Trial*, Dr. Nigel Bush, National Center for Telehealth and Technology/Portland VAMC, $888,703 (Appendix 12)
    - *Warning Signs for Suicide Attempts,* Drs. Courtney Bagge and Ken Conner, University of Mississippi Medical Center/University of Rochester Medical Center, $2,322,993 (Appendix 13)
- Florida State University funds 11 studies:
    - *Reason for Living (RFL) Intervention*, Dr. Craig Bryan, University of Utah, $1,013,904
    - *Development and Evaluation of a Brief, Suicide Prevention Intervention Reducing Anxiety Sensitivity,* Dr. N. Brad Schmidt, Florida State University, $299,756
    - *Military Continuity Project (MCP),* Dr. Katherine Comtois, University of Washington, $1,594,104
    - *A Taxometric Investigation of Suicide,* Drs. Jill Holm-Denoma and Tracy Witte, University of Denver/Auburn University, $139, 620
    - *Identifying Factors Associated with Future Suicidal Self-Directed Violence within a Sample of Mississippi National Guard Personnel,* Dr. Michael Anestis, University of Southern Mississippi, $704,000
    - *Controlled Evaluation of a Computerized Anger-Reduction Treatment for Suicide Prevention,* Dr. Jesse Cougle, Florida State University, $200,000
    - *New Approaches to the Measurement and Modification of Suicide-Related Cognition,* Dr. Matthew Nock, Harvard University, $886,665
    - *Development and Evaluation of a Brief, Suicide Prevention Intervention Targeting Anxiety and Mood Vulnerabilities,* Dr. N. Brad Schmidt, Florida State University, $1,600,000

- *Using Evaluative Conditioning to Improve Marriage,* Dr. Jim McNulty, Florida State University, $97,435
- *Perceptual Retraining to Reduce Suicide Risk*, Dr. Wen Lin, Florida State University, $142,667
- *Reducing Suicide Risk Associated with Weight Loss*, Florida State University, $130,529

Task 7. Establish pre-doctoral and postdoctoral training experiences at FSU and MIRECC (month 24)

- Pre-doctoral and postdoctoral training experiences were established at FSU and the VISN 19 MIRECC.
- The MSRC funded the following four postdoctoral pilot grants:
  - *Assessment of Cognitive Functioning as it relates to Risk for Suicide in Veterans with HIV/AIDS*, Dr. Gina Signoracci, Denver VAMC, $47,454
  - *Behaviorally Assessing Suicide Risk*, Dr. Sean Barnes, Denver VAMC, $46,328
  - *Romantic Relationship Satisfaction and Self-Directed Violence in Veterans*, Dr. Amanda Stoeckel, Salt Lake City VAMC, $40,160
  - *Longitudinal Assessment of Physical Activity and Suicide Risk,* Dr. Collin Davidson, Denver VAMC, $46,665
- The MSRC offers annual Dissertation Completion Awards:
  - 2012 recipient: Jessica Ribeiro earned this award for her work on *Overarousal and Fearlessness about Death in Imminent Suicidal Behavior.* Ms. Ribeiro successfully defended her dissertation in June 2013.
  - 2013 recipients: Dan Capron earned the award for his study on the *Evaluation of a Cortisol-Augmented Interpretation Bias Modification for Anxiety Sensitivity on Suicidal Ideation.* Mr. Capron successfully defended his dissertation in June 2014. Alexis May successfully defended her study on *Assessing Motivations for Suicide Attempts: Developing and Validating a Theoretically Driven Instrument* in June 2015.
  - 2014 recipients: Erin Poindexter was awarded for her study, *An Experimental Manipulation of Acquired Capability in a sample of Combat Veterans: A Longitudinal Study.* Caroline Silva earned the award for her work on *Effects of a Burdensomeness Manipulation and the Capability for Suicide on a Proxy for Lethal Approach Behavior.* Sarah Victor earned the dissertation completion award for her study, *The Contributions of Affect, Cognition, and Life Experiences to Self-Directed Violence*. The 2014 recipients all expect to defend their dissertations within 2016.
  - 2015 recipients: The MSRC awarded seven Dissertation Completion Awards to Kelly Zuromski (*Do Changes in Insomnia Precede Changes in Suicide Ideation?*), Carol Chu (*The Role of Oxytocin in Social Exclusion and Suicidal Behavior*), Christopher Hagan (*Hopelessness Regarding Thwarted Belonging and Perceived Burdensomeness)*, Ashley Cole (*An Examination of Grit as a Moderator of the Relationship between Perceived Discrimination and Suicide Ideation*), Matthew Michaels (*Gender Norms, Sexual Orientation and Minority Stress*), Lauren Khazem (*Disability-related Factors and Perceived Stigma*), and Courtney Golding (*Examining the Impact of Religion and Religiosity on the Coping of Suicide Survivors*).

- The MSRC offers an annual Pre-Conference Research Training Day for students and research fellows, with the purpose of developing pre-doctoral and postdoctoral students and fellows' skills as military/Veteran suicide researchers. Since 2013, the MSRC offered a $1,000 stipend to a total of 88 students and fellows to participate in this workshop. The event occurred in conjunction with the American Association of Suicidology's Annual Conference. The aims were to educate advanced students and fellows in state-of-the-art research techniques, grant writing, research design, and regulatory issues. The faculty found the day to be productive, with 100% of the faculty interested in participating in the next MSRC training day. Since the training day, participants started corresponding with potential collaborators, accessing national databases to answer research questions, writing grant applications, and four students earned an MSRC Dissertation Completion Award. The planning of the 2016 Pre-Conference Training Day is underway.
- Previous MSRC postdoctoral fellow, Mike Anestis, accepted a tenure-track position as an Assistant Professor in the Department of Psychology, at the University of Southern Mississippi and is a funded MSRC PI. In 2014, Dr. Anestis was awarded the Nina Bell Suggs Endowed Professorship, determined to have the greatest potential for a junior faculty member to make a substantial contribution to his or her field of expertise.
- Jessica Ribeiro, MSRC postdoctoral fellow through Harvard University at Dr. Matthew Nock's lab, accepted a postdoctoral fellowship position at Vanderbilt.
- Joseph Franklin, postdoctoral fellow supported through Dr. Matthew Nock's MSRC grant, accepted a tenure-track professor position at Vanderbilt.
- The current MSRC postdoctoral fellows include Ted Bender and Keith Jennnings. Dr. Jennings has an appointment with the MSRC through Catholic University of America. He is extending the MSRC CAMS study to a VA feasibility project.

Task 8. Consortium review by External Advisory Board (month 24)

- The Military External Advisory Board (MEAB) met with Core A in May 2012 (month 20) and August 2012 (month 23).
- Drs. Gutierrez and Joiner presented to the MOMRP at the May 2012 In-Progress Review (IPR) meeting (month 20).
- Core A reviews the progress of the Consortium with their senior advisors at annual meetings and quarterly conference calls.

Task 9. Preparing year two quarterly reports (months 15, 18, 21, 24)

- The 1st, 2nd, 3rd and 4th quarter reports were prepared and distributed on time.

Task 10. Continue to refine research priorities (months 25-60):

10a. Disseminate results in hand (month 27)

- Drs. Bush, Cerel, Johnson, Schmidt, Signoracci, Barnes, Davidson, and Stoeckel finished uploading their data to the Core C database for their completed studies.
- Drs. Brenner, Bernert, Amick and Homaifar, Matarazzo, Schmidt, Comtois, Bryan, Gutierrez and Joiner, Yurgelun-Todd, Cougle, Anestis, Bagge and Conner, Nock, Li, and Keel are uploading data quarterly to Core C, after it is cleaned.
- Dr. Bush's Virtual Hope Box application press release occurred in May 2014 (month 44). The beta version of the application is available for download and has been

disseminated widely through DOD, T2, VA, and MSRC channels. Dr. Bush published on the VHB pilot within *Suicide and Life-Threatening Behavior* (month 52).

- Dr. Cerel and MSRC Senior Advisor, Ret. COL Castro, co-authored a white paper from the Military Suicide Bereavement study on promoting resilience following suicide exposure in military populations: https://msrc.fsu.edu/sites/msrc.fsu.edu/files//Military%2520Suicide%2520Exposure.pdf (month 45). Dr. Cerel's findings are published in the *Journal of Affective Disorders* (month 47).
- Dr. Lisa Brenner and colleagues' publication on the cross-cultural adaptation of the Window to Hope intervention will encourage other research groups to explore the utility of this intervention in US and/or Veteran populations (month 48).

10b. Plan future projects (month 33-36)

- The MSRC regularly communicates with DSPO, Army STARRS, and the DOD on future collaborations.

Task 11. Consortium review by the MEAB (month 36)

- The Military External Advisory Board (MEAB) met with Core A in May 2013 (month 32).
- Drs. Gutierrez and Joiner presented to the MOMRP at the May 2013 In-Progress Review (IPR) meeting (month 32).
- Core A reviews the progress of the Consortium with their senior advisors at annual meetings and on an as needed basis.

Task 12. Preparing year three quarterly reports (months 27, 30, 33, 36)

- The 1st, 2nd, 3rd and 4th quarter reports were prepared and distributed on time.

Task 13. Consortium review by the MEAB (month 48)

- The Military External Advisory Board (MEAB) met with Core A in May 2014 and 2015 (months 44 and 56).
- Drs. Gutierrez and Joiner presented to the MOMRP at the May 2014 and 2015 In-Progress Review (IPR) meetings (months 44 and 56).
- The MSRC hosted its first annual IPR Meeting in June 2014 with MSRC Funded PIs and a MOMRP representative in attendance, to review the projects' progress, challenges, and solutions (month 45).
- The MSRC hosted its second annual IPR Meeting with MSRC Funded PIs, Senior Advisors and MOMRP representation, in July 2015 (month 58).
- Core A reviews the progress of the Consortium with their senior advisors at annual meetings and on an as needed basis.

Task 14. Preparing year three quarterly reports (months 39, 42, 45, 48)

- The 1st, 2nd, 3rd and 4th quarter reports were prepared and distributed on time.

Task 15. Preparing year five quarterly reports (months 51, 54, 57, 60)

- The 1st, 2nd, 3rd and 4th quarter reports were prepared and distributed on time.

Task 16. Preparing final project report (months 52-72)

- The MSRC was approved for a one-year No Cost Extension. The final project report will be completed once all final reports from funded studies are received.

Overall project timeline:

Year 1 — Complete Task s 1, 2, 3, 4, and 5

- Tasks 1, 2, 3, 4, 5, and 7 were completed. Task 6 is ongoing.

Year 2 — Complete Tasks 7, 8, and 9, Task 6 is ongoing for the length of the grant

- Task is 6 is ongoing, Tasks 7, 8, and 9 are completed. Task 10 was initiated.

Year 3 — Complete Tasks 10a, 10b, 11, and 12, Tasks 6 and 10 are ongoing for the length of grant.

- Tasks 6 and 10 are ongoing; Tasks 10a, 10b, 11 and 12 are completed.

Year 4 – Complete Tasks 13 and 14, Tasks 6 and 10 are ongoing for the length of the grant.

- Tasks 6 and 10 are ongoing; Tasks 13 and 14 are completed.

Year 5 – Complete Tasks 15 and 16, Tasks 6 and 10 are ongoing for the length of the grant.

- Tasks 6, 10, and 16 are ongoing; Task 15 is complete.

Key Research Accomplishments:

- With the advisory support of the ISPRP and MEAB, the MSRC funded twenty-three research projects and four postdoctoral pilot grants exploring suicide prevention, intervention, and postvention within active duty and Veteran populations.
- Authored 20 white papers at the request of MOMRP and other government entities.
- Dissemination and implementation for MSRC funded research in underway and influencing practice and policy. The VHB application and clinical guidelines have been released widely through the efforts of the DOD, T2, VA, and MSRC. The Window to Hope Intervention has been translated to meet the needs of a US Veteran population and policy recommendations from the Military Suicide Bereavement study were disseminated and available on the MSRC website.
- In addition to the 27 studies funded by the MSRC, the MSRC Common Data Elements were distributed to other researchers collecting data relevant to military suicide research.
- The MSRC estimates over $15 million was leveraged to support research in line with the Consortium's mission.

Reportable Outcomes:

Data collection is underway or complete for all DRI subcontracted studies. Drs. Bush (pilot grant), Cerel, Brenner and Johnson completed data collection and uploaded their measures to the MSRC Core C database. Drs. Bernert, Bush (RCT grant), Gutierrez and Joiner, Homaifar and Amick, Matarazzo, Yurgelun-Todd and Bagge are actively recruiting for their studies.

Presentations:

MSRC staff presented at 14 conferences and meetings in FY2011 and attended a total of 26. In FY2012, the MSRC staff and funded PIs attended and presented at 11 conferences, for multiple breakout sessions. In FY2013, MSRC staff presented at 10 conferences and MSRC funded PIs introduced their research at 14 conferences. In FY2014, MSRC staff presented at 12 conferences and meetings. Funded PIs presented their MSRC projects at 15 conferences. In FY2015, MSRC staff and Funded PIs gave 25 presentations at national and international conferences and meetings.

Below are references for a number of the conference presentations:

Bernert RA, Iwata NG, Kim JK, Moscowitz A, & Hom MH. (June 2015). Perceived Stigma Toward Mental Health in Association with Sleep Disturbances and as an Acute Predictor of Suicidal Symptoms. Associated Professional Sleep Societies (APSS), LLC 29th Annual Meeting. Seattle, WA.

Bush NE, Dobscha SK. A Virtual Hope Box Smartphone App: Proof of Concept in a Clinical Sample of Veterans. (December 2014). "Federal Health in Transition," AMSUS: The Society of Federal Health Professionals Annual Meeting. Washington DC.

Carney, E., O'Connor, S.S., Johnson, L., Jobes, D.A., & Kaminer, B. (2015, April). Comparative impact of group cohesion and length of treatment for veterans enrolled in a suicide-focused group therapy. American Association of Suicidology conference. Atlanta, GA.

Cerel, J. (2015, July) VA/DoD. The Continuum of Suicide Survivorship. Quarterly Survivors Forum, VHA National Conference Center. Arlington, VA (via webconference).

Cerel, J. (2015, Sept 30) Veteran Exposure to Suicide: Prevalence and Correlates. Quarterly VA Blind Rehabilitation Journal Club. (via webconference).

Dobscha SK, Bush NE, Crain A, Thomas E, Denneson L, Cromer R, Kinn JT. (December 2014). A Virtual Hope Box Smartphone App: Proof of Concept in a Clinical Sample of Veterans. Special Operations Medical & Scientific Assembly. Tampa, Florida.

Gutierrez, P. M. (April 2015). Imminent Risk Assessment Symposium. American Association of Suicidology Annual Conference. Atlanta, GA.

Gutierrez, P. M. (August 2015). The Military Suicide Research Consortium: Clinical trials reducing suicide risk and increasing resilience. Military Health System Research Symposium. Ft. Lauderdale, FL.

Gutierrez, P. M. (April 2015). Military Suicide Panel. American Association of Suicidology Annual Conference. Atlanta. GA.

Gutierrez, P. M. (March 2015). Military Suicide Research Consortium Treatment Studies. Shoresh Meeting. Ramat-Gan, Israel.

Gutierrez, P. M. (March 2015). Predictive Validity of Suicide-specific Measures. Shoresh Meeting. Ramat-Gan, Israel.

Gutierrez, P. M., & Joiner, T. E. (February 2015). Military Research Summit. Los Angeles, CA.

Gutierrez, P. M. & McGurk, D. (June 2015). Advances in Understanding Suicide in the US Military. International Association for Suicide Prevention (IASP) Annual Conference. Montreal, Canada.

Matarazzo, B. (December 2014). Meeting Suicidal Veterans and Military Personnel on Their Turf: The HOME Program Poster. Special Operations Medical Association (SOMA). Tampa, Florida

Soberay, K., Cerel, J., van de Venne, J., Moore, M., & Maple, M. (April 2015). Exposure to Suicide versus Traumatic Deaths Explored within an Interpersonal Theory. American Association of Suicidology Annual Conference. Atlanta, GA.

Thieman, R., Soto-Freita, A., O'Connor, S.S., Johnson, L., Jobes, D.A., & Kaminer, B. (2015, April). The impact of interpersonal abuse on Veterans enrolled in a suicide-focused group therapy. American Association of Suicidology conference. Atlanta, GA.

Yurgelun-Todd, D., & Renshaw, P. (December 2014). Proton Metabolite Correlates of Anxiety in Veterans. Special Operations Medical Association (SOMA). Tampa, FL.

Yurgelun-Todd, D., & Renshaw, P. (December 2014). Water Bound Pool Fraction (BPF) Imaging as an Indicator of White Matter Integrity in Veterans with TBI. Special Operations Medical Association (SOMA). Tampa, FL.

Publications:

In 2012, staff from the MIRECC and FSU sites collaborated on a secondary data analysis project resulting in the following article:

Ribeiro, J. D., Pease, J. L., Gutierrez, P. M., Silva, C., Bernert, R. A., Rudd, M. D., & Joiner, T. E. Jr. (2012). Sleep problems outperform depression and hopelessness as cross-sectional and longitudinal predictors of suicidal ideation and behavior in young adults in the military. *Journal of Affective Disorders, 136,* 743-750.

ABSTRACT:

Background: Sleep problems appear to represent an underappreciated and important warning sign and risk factor for suicidal behaviors. Given past research indicating that disturbed sleep may confer such risk independent of depressed mood, in the present report we compared self-reported insomnia symptoms to several more traditional, well-established suicide risk factors: depression severity, hopelessness, PTSD diagnosis, as well as anxiety, drug abuse, and alcohol abuse symptoms.

Methods: Using multiple regression, we examined the cross-sectional and longitudinal relationships between insomnia symptoms and suicidal ideation and behavior, controlling for depressive symptom severity, hopelessness, PTSD diagnosis, anxiety symptoms, and drug and alcohol abuse symptoms in a sample of military personnel (N=311).

Results: In support of a priori hypotheses, self-reported insomnia symptoms were cross-sectionally associated with suicidal ideation, even after accounting for symptoms of depression, hopelessness, PTSD diagnosis, anxiety symptoms and drug and alcohol abuse. Self-reported insomnia symptoms also predicted suicide attempts prospectively at one-month follow up at the level of a non-significant trend, when controlling for baseline self-reported insomnia symptoms, depression, hopelessness, PTSD diagnosis and anxiety, drug and alcohol abuse symptoms. Insomnia symptoms were unique predictors of suicide attempt longitudinally when only baseline self-reported insomnia symptoms, depressive symptoms and hopelessness were controlled.

Conclusions: These findings suggest that insomnia symptoms may be an important target for suicide risk assessment and the treatment development of interventions to prevent suicide.

Staff from the VISN 19 MIRECC completed an extensive literature review resulting in the following article:

Matarazzo, B. B., Barnes, S. M., Pease, J. L., Russell, L. M., Hanson, J. E., Soberay, K. A., & Gutierrez, P. M. (2014). Suicide Risk among Lesbian, Gay, Bisexual, and Transgender Military Personnel and Veterans: What Does the Literature Tell Us? *Suicide & Life-Threatening Behavior, 44,* 200-217. doi: 10.1111/sltb.12073.

ABSTRACT:

Research suggests that both the military/Veteran and the lesbian, gay, bisexual and transgender (LGBT) populations may be at increased risk for suicide. A literature review was conducted to identify research related to suicide risk in the LGBT military/Veteran population. Despite the paucity of research directly addressing this issue, themes evident in the literature emerged related to LGBT status and suicide risk as well as LGBT military service members and Veterans. Factors such as social support and victimization appear to be particularly relevant. Suggestions are made with respect to future research that is needed on this very important and timely topic.

In 2014, staff from the Denver and FSU MSRC sites collaborated with MSRC funded PIs on a meta-analysis resulting in the following article:

Anestis, M. D., Soberay, K. A., Gutierrez, P. M., Hernández, T. D., & Joiner, T. E. Jr. (2014). Reconsidering the link between impulsivity and suicidal behavior. *Personality and Social Psychology Review, 18*, 366-386. doi: 10.1177/1088868314535988

ABSTRACT:
It is widely accepted that suicidal behavior often occurs with little planning. We propose, however, that suicidal behavior is rarely if ever impulsive-that it is too frightening and physically distressing to engage in without forethought-and that suicidal behavior in impulsive individuals is accounted for by painful and fearsome behaviors capable of enhancing their capacity for suicide. We conducted a meta-analysis of the association between trait impulsivity and suicidal behavior and a critical review of research considering the impulsiveness of specific suicide attempts. Meta-analytic results suggest the relationship between trait impulsivity and suicidal behavior is small. Furthermore, studies examining a mediating role of painful and provocative behaviors have uniformly supported our model. Results from our review suggest that researchers have been unable to adequately measure impulsivity of attempts and that measures sensitive to episodic planning must be developed to further our understanding of this phenomenon.

In FY 2015, MSRC staff from Denver published the following manuscripts:
Anestis, M.D., Joiner, T. E. Jr., Gutierrez, P. M., & Hanson, J. E. (2014). The modal suicide decedent was not intoxicated at the time of death: A meta-analysis with implications for understanding suicidal behavior and human nature. *Journal of Abnormal Psychology*, *4*, 835-840. doi: 10.1037/a0037480.

ABSTRACT:
We identified and analyzed a total of 92 studies, representing 167,894 suicide decedents, to determine if there is evidence to support what appears to be a widely held cultural, clinical, and scholarly view that many people who die by suicide had been drinking at the time of death. It was determined that, based on weighted averages, approximately 27% of suicide decedents had above-zero blood alcohol concentrations (BACs) at the time of death. We emphasize that it was not 27% who were intoxicated at the time of death; rather, 27% had above-zero BACs and 73% had BACs of 0.00%. Among studies of suicide decedents, BACs differed as a function of race (higher in non-White individuals). We conclude that the role of alcohol use at the time of death may be less than some assume, and this interpretation can inform clinical practice and theories of suicide. Important unanswered questions are posed which will help refine research in this area going forward.

Bodell, L. P., Forney, K. J., Keel, P. K., Gutierrez, P. M. & Joiner, T. E. (2014). Consequences of Making Weight: A Review of Eating Disorder Symptoms and Diagnoses in the United States Military. Clinical Psychology: *Science and Practice, 21*, 398-409.

ABSTRACT:
Eating disorders are serious psychiatric illnesses associated with health problems. Such problems may compromise military performance, highlighting the need to establish the level of eating

pathology that exists in military samples. This article qualitatively reviews prevalence estimates of eating disorder symptoms and diagnoses in military samples, providing nonmilitary estimates for context. Findings suggest that eating disorder symptoms are prevalent in cadets and active duty service members, especially when using self-report measures. The increased salience of weight in the military and increased exposure to trauma may influence risk for eating disorders. Alternatively, individuals at risk for eating disorders may self-select into the military. Overall, this review suggests that eating disorder symptoms are common in military samples and that further research is warranted.

Tucker, R. P., Crowley, K. J., Davidson, C. L., & Gutierrez, P. M. (2015). Risk factors, warning signs, and drivers of suicide: what are they, how do they differ, and why does it matter?. *Suicide and Life-Threatening Behavior*. DOI: 10.1111/sltb.12161

ABSTRACT:
Research investigating suicide attempts and deaths by suicide has yielded many specific risk factors and warning signs for future suicidal behaviors. Yet, even though these variables are each valuable for suicide prevention efforts, they may be limited in their applicability to clinical practice. The differences among risk factors, warning signs, and "drivers," which are person-specific variables that lead individuals to desire death by suicide, are highlighted. The scarce evidence on drivers is described and specific recommendations for conducting future drivers-focused research and targeting them in clinical practice are suggested.

Anestis, M. D., Joiner, T., Hanson, J. E., & Gutierrez, P. M. (2015). Response to commentary on "The modal suicide decedent did not consume alcohol just prior to the time of death: An analysis with implications for understanding suicidal behavior". *Journal of Abnormal Psychology, 124*(2), http://dx.doi.org/10.1037/abn0000062

ABSTRACT:
A commentary on our article, "The Modal Suicide Decedent Did Not Consume Alcohol Just Prior to the Time of Death: An Analysis with Implications for Understanding Suicidal Behavior," published in this issue, was reviewed. We agree with the authors of that commentary regarding a coding error that has now been corrected. While we disagree with several of the points raised by the authors, the majority of our disagreements lie in how the results of our original study are being interpreted. We provide a point-by-point response to that commentary and thank the authors for advancing scientific debate on what we view as a very important issue in understanding the role of alcohol as a risk factor for suicide.

Publications in Press:

Davidson, C. L., Anestis, M., & Gutierrez, P. M. (in press). Ecological momentary assessment is a neglected methodology in suicidology. *Archives of Suicide Research*.

MSRC Funded PI Publications (Denver subawards)

MSRC funded PIs are submitting manuscripts regularly as studies are in their final stages:

Bush, N. E., Dobscha, S. K., Crumpton, R., Denneson, L. M., Hoffman, J. E., Crain, A., ... & Kinn, J. T. (2015). A Virtual Hope Box Smartphone App as an Accessory to Therapy: Proof-of-Concept in a Clinical Sample of Veterans. Suicide and Life-Threatening Behavior, 45(1), 1-9.

Cerel, J., van de Venne, J. G., Moore, M. M., Maple, M. J., Flaherty, C., & Brown, M. M. (2015). Veteran exposure to suicide: Prevalence and correlates. Journal of affective disorders, 179, 82-87.doi:10.1016/j.jad.2015.03.017

Johnson, L. L., O'Connor, S. S., Kaminer, B., Jobes, D. A., & Gutierrez, P. M. (2014). Suicide-focused group therapy for veterans. *Military Behavioral Health.*

Matarazzo B, Clemans T, Signoracci G, Hoffberg A, Simpson GK, Brenner LA (2014). Cross-Cultural Adaptation of Window to Hope: A Psychological Intervention to Reduce Hopelessness in Individuals with a History of Traumatic Brain Injury. *Brain Injury, 10,* 1238-1247. doi: 10.3109/02699052.2014.916419

White Papers:
The MSRC disseminated two white papers in 2015:

Hanson, J. & Dwyer, M. Military Suicide Research Consortium (November 2014). The Impact of Holidays on Suicide. https://msrc.fsu.edu/sites/msrc.fsu.edu/files//MSRC%20-Holiday%20and%20Suicide.pdf

Holm-Denoma, J & Witte, T. Military Suicide Research Consortium (March 2015). Taxometric Study of Suicide Risk.
https://msrc.fsu.edu/sites/msrc.fsu.edu/files//MSRC_Taxometric_Study_of_Suicide_Risk_Drs_Holm-Denoma_Witte.pdf

Within FY 2015, the MSRC responded to 17 media inquiries, addressed 7 research information requests and referred 4 researchers to the BAA.

In an effort to take advantage of leveraging funds, this is a reoccurring agenda item on the bi-monthly conference calls and requested on quarterly reports from funded investigators. The MSRC collaborates in leveraging funds that include an increase of grant funds, time, and infrastructure support. Below are some of the most noteworthy leveraging funds efforts:

Grant/Awards

Principal Investigator	Grant/Award	MSRC support	Monetary Value
Ron Acierno	Omega-3 & Suicide Prevention	Consultation & inclusion of MSRC Common Data Elements	
Lisa Brenner	Active Control Component WtoH	Funding an additional active control component to MSRC funded study	

Rebecca Bernert	NIMH K Award	Recipient of award after MSRC funding - covers salary of MSRC funded project
Jennifer Hames	John Templeton Foundation	FSU Graduate Student, MSRC staff Received grant to test the Efficacy of a Gratitude Intervention in Individuals at Risk for Suicide and Depression
Jesse Cougle	CRC planning grant	Launch a new idea from anger research, to start a larger clinical application
Jesse Cougle	National Institute of Drug Abuse	Launch a new idea from MSRC anger research
Brad Schmidt	AFSP DIG-0-030-12	Further developing MSRC funded cognitive anxiety research
Dan Capron	NIH grant	Further developing MSRC cognitive anxiety intervention
Lindsay Bodell	NIH clinical training grant	FSU Graduate Student, MSRC staff
Deborah Yurgelun-Todd	State of Utah provided funding for neuroimaging equipment	Successes of MSRC funded study led to the state providing upgraded imaging equipment
Caroline Silva	McKnight Dissertation Award	FSU Graduate Student, MSRC staff
Bridget Matarazzo	Expansion of HOME Clinical Demonstration Project to additional sites (Seattle and Raleigh-Durham) and continue the project in Salt Lake City	The expansion of HOME serves as a nice compliment to the work of the HOME MSRC grant
Bridget Matarazzo	Expansion of HOME Clinical Demonstration Project to accommodate the needs of rural Veterans in North Carolina (Durham)	The expansion of the HOME Clinical Demonstration Project serves as support of the overall intervention studied
Leah Shelef **Peter Gutierrez** **Thomas Joiner**	Israel Defense Forces	The Gold Standard Study and Israel Defense Forces are collecting the same suicide measures within their military populations to explore international differences at completion
Gina Signoracci **Sean Barnes** **Amanda Stoeckel** **Collin Davidson**	MIRECC Postdoctoral Pilot Grants	The MSRC funded postdoctoral pilot projects, with their salaries absorbed by the

	VISN 19 MIRECC	
Kelly Soberay	Colorado Brain Injury Program Education Grant	MSRC Staff
Ian Stanley **Melanie Hom**	Violet and Cyril Franks Scholarship, American Psychological Foundation	Modifying Help-Seeking Stigma: Development and Prospective Evaluation of a Novel Cognitive Bias Modification Intervention

Consultation

Contact / Organization	Project	MSRC support
Army STARRS	Collaboration on military suicide prevention and intervention research grant ideas	Drs. Gutierrez and Joiner regularly share ideas and resources with the Army STARRS PIs, as well as discuss their epidemiological findings and recommendations for MSRC prevention and intervention research
Colorado Office of Suicide Prevention	Means Restriction Program Evaluation	Dr. Gutierrez was consulted for this effort
Colorado Office of Suicide Prevention	Public Health Campaign targeting working age men	Dr. Gutierrez was consulted for this effort
Colorado Office of Suicide Prevention	ManTherapy.org, including international expansion and CDC grant application	Drs. Joiner and Gutierrez are on-going consultants for these efforts
Florida State University	FSU initiative to connect student Veterans to the National Science Foundation Grant	Drs. Joiner and Gutierrez were consulted for this effort
Defense Centers of Excellence	DCoE's Screening & Assessment Tools for Suicide Prevention Guide	Dr. Gutierrez reviewed and provided consultation for the 61 page resource
MOMRP	Response letter for general inquires	Dr. Gutierrez provided general response letter on funding and other research inquires to free time for the MOMRP staff
Defense Suicide Prevention Office	Suicide screening and assessment project	Dr. Gutierrez reviewed DSPO's suicide screening and assessment recommendations; provides on-going consultation
Dr. Pamela Keel	Including military history questions to study of suicidal behavior and eating disorders	Dr. Joiner was consulted on the inclusion of military history in suicide study
DOD **VA**	VA/DOD Clinical Practice Guidelines for Suicide Prevention	Drs. Joiner and Gutierrez and Dr. Castro (Ret. COL), provided written input for the guidelines
House of Representatives	Questions on IED, TBI, and Suicide	Drs. Joiner and Gutierrez advised the House of Representatives on their questions and will either develop a

		proposal or designate a research team to explore this topic
MOMRP Suicide Portfolio Manager	Department of Defense study on Predictive Analytics for Suicide Risk	Dr. Joiner provided information regarding the application of these techniques to suicide risk
MOMRP Suicide Portfolio Manager	Hyperbaric Oxygen Therapy (HBOT)	Dr. Joiner provided information on HBOT
All MSRC funded PIs	All MSRC funded studies	The MSRC hosts a quarterly PI call and annual In-Progress Review meeting for the funded PIs to benefit from each other's knowledge and research experience
Danish Defense and Veterans Departments	Danish soldiers' reintegration problems	Drs. Joiner and Gutierrez provided their expertise on military suicide to Dr. Trine Madsen. Discussions continue on future international collaborations
Centers for Disease Control and Prevention (CDC)	Meeting on preventing prescription overdoes in middle-age men, MSRC briefing	Dr. Gutierrez briefed representatives on the MSRC and its research portfolio
National Fallen Firefighter Foundation	Prevention of suicide in firefighters	Dr. Joiner provided consultation on the prevalence of suicide ideation and death rates in firefighters.
Portland VAMC	Systematic review on suicide assessment measures	Dr. Gutierrez is a technical expert for the systematic review
Big White Wall: UK Ministry of Defence, Help for Heroes, UK Department of Health, & Armed Forces Covenant	Delivering better mental health and emotional resilience for the UK Armed Forces Community	Dr. Joiner provided consultation to the Big White Wall group
Israel Defense Forces/ Shoresh Meeting	U.S. and Israeli Medical researchers collaborate	Dr. Gutierrez participated in the collaborative Shoresh meeting with US and Israeli researchers, presenting on the MSRC and Toward a Gold Standard research. Following the 2015 Shoresh Meeting, Dr. Gutierrez started discussions to submit a proposal to the National Science Foundation, combining expertise of US (Drs. Gutierrez and Joiner) and Israeli suicide researchers.
SAMHSA	Suicide Intervention and Prevention Proposal	Dr. Joiner reviewed a SAMHSA proposal on suicide intervention and prevention that includes infrastructure similar to the MSRC. Using his expertise as a MSRC Director, he provided feedback to SAMHSA.
University of Maryland	Online Screening and Early Intervention to Prevent Suicide among Middle-Aged Men	Dr. Joiner is a consultant on a grant through the University of Maryland.

MSRC Common Data Elements

Contact / Organization	Project	MSRC support
Dr. Bob Heinssen	NIH Grants	NIH is interested in adding the MSRC Common Data Elements to future studies
Dr. Jane Pearson	NIMH Grants	NIMH is interested in leveraging the MSRC Common Data Elements to make use of existing data sets to explore questions of treatment effectiveness
NIMH	PhenX Suicide-specific Toolkit	Dr. Gutierrez served on the PhenX workgroup to develop the toolkit, which is available to NIMH funded PIs.

Conclusion:

The Military Suicide Research Consortium reached its annual goals and research aims. Denver Research Institute funds twelve research projects and four postdoctoral research pilot grants. Florida State University funds eleven research teams. The three Cores collaborate on a daily basis, working toward the ultimate goals of suicide prevention in the military and information dissemination to decision makers, practitioners, and others who are accountable for ensuring the mental health of military personnel.

References:

Anestis, M.D., Joiner, T. E. Jr., Gutierrez, P. M., & Hanson, J. E. (2014a). The modal suicide decedent was not intoxicated at the time of death: A meta-analysis with implications for understanding suicidal behavior and human nature. *Journal of Abnormal Psychology*, *4*, 835-840. doi: 10.1037/a0037480.

Anestis, M. D., Joiner, T., Hanson, J. E., & Gutierrez, P. M. (2015). Response to commentary on "The modal suicide decedent did not consume alcohol just prior to the time of death: An analysis with implications for understanding suicidal behavior". *Journal of Abnormal Psychology, 124*(2), http://dx.doi.org/10.1037/abn0000062

Anestis, M. D., Soberay, K. A., Gutierrez, P. M., Hernández, T. D., & Joiner, T. E. Jr. (2014b). Reconsidering the link between impulsivity and suicidal behavior. *Personality and Social Psychology Review, 18*, 366-386. doi: 10.1177/1088868314535988

Bodell, L. P., Forney, K. J., Keel, P. K., Gutierrez, P. M. & Joiner, T. E. (2014). Consequences of Making Weight: A Review of Eating Disorder Symptoms and Diagnoses in the United States Military. Clinical Psychology: *Science and Practice, 21*, 398-409.

Bush, N. E., Dobscha, S. K., Denneson, L. M., Hoffman, J. E., Crain, A., Crumpton, R., Cromer, R., & Kinn, J. T. (2015). A Virtual Hope Box Smartphone App as an Accessory to Therapy: Proof-of-Concept in a Clinical Sample of Veterans. Suicide and Life-Threatening Behavior, 45(1), 1-9.

Cerel, J., van de Venne, J. G., Moore, M. M., Maple, M. J., Flaherty, C., & Brown, M. M. (2015). Veteran exposure to suicide: Prevalence and correlates. Journal of affective disorders, 179, 82-87.doi:10.1016/j.jad.2015.03.017

Johnson, L. L., O'Connor, S. S., Kaminer, B., Jobes, D. A., & Gutierrez, P. M. (2014). Suicide-focused group therapy for veterans. *Military Behavioral Health.*

Matarazzo, B. B., Barnes, S. M., Pease, J. L., Russell, L. M., Hanson, J. E., Soberay, K. A., & Gutierrez, P. M. (2014a). Suicide Risk among Lesbian, Gay, Bisexual, and Transgender Military Personnel and Veterans: What Does the Literature Tell Us? *Suicide & Life-Threatening Behavior, 44,* 200-217. doi: 10.1111/sltb.12073.

Matarazzo B, Clemans T, Signoracci G, Hoffberg A, Simpson GK, Brenner LA (2014b). Cross-Cultural Adaptation of Window to Hope: A Psychological Intervention to Reduce Hopelessness in Individuals with a History of Traumatic Brain Injury. *Brain Injury, 10,* 1238-1247. doi: 10.3109/02699052.2014.916419

Ribeiro, J. D., Pease, J. L., Gutierrez, P. M., Silva, C., Bernert, R. A., Rudd, M. D., & Joiner, T. E. Jr. (2012). Sleep problems outperform depression and hopelessness as cross-sectional and longitudinal predictors of suicidal ideation and behavior in young adults in the military. *Journal of Affective Disorders, 136,* 743-750.

Tucker, R. P., Crowley, K. J., Davidson, C. L., & Gutierrez, P. M. (2015). Risk factors, warning signs, and drivers of suicide: what are they, how do they differ, and why does it matter?. *Suicide and Life-Threatening Behavior*. DOI: 10.1111/sltb.12161

Appendices:

A1 VITA

DATE: 9-16-15
NAME: Peter M. Gutierrez
ADDRESS:

EDUCATION:

Degree	Date	Institution	Location
Ph.D., Clinical Psychology	1997	University of Michigan	Ann Arbor, MI
M.A., Clinical Psychology	1994	University of Michigan	Ann Arbor, MI
B.A., Psychology	1991	Winona State University	Winona, MN

Summa Cum Laude

AREAS OF SPECIALIZATION AND RESEARCH INTERESTS:
Suicide risk factors, assessment, and interventions. Scale development and psychometric evaluation.

PROFESSIONAL EXPERIENCE:

2008-	Clinical/ Research Psychologist, Department of Veterans Affairs, Rocky Mountain Mental Illness Research and Education Clinical Center.
6/9/08-	Licensed Clinical Psychologist, Colorado #3203.
7/1/14-	Professor, University of Colorado School of Medicine, Department of Psychiatry.
2009-2014	Associate Professor, University of Colorado School of Medicine, Department of Psychiatry.
2008-2009	Visiting Associate Professor, University of Colorado Denver School of Medicine, Department of Psychiatry.
2007-2008	Research Psychologist, Denver VA Medical Center, Mental Illness Research and Education Clinical Center.
2006-2008	Adjoint Associate Professor, University of Colorado Denver School of Medicine, Department of Psychiatry.
2006-2007	Research Consultant, Denver VA Medical Center, Mental Illness Research and Education Clinical Center.
2002-2007	Associate Professor, Northern Illinois University, Department of Psychology.
2002-2006	Assistant Chair, Northern Illinois University, Department of Psychology.
1996-2002	Assistant Professor, Northern Illinois University, Department of Psychology.
1995-1996	University of Michigan, University Center for the Child and Family, Psychology Intern (APA Accredited through University's Captive Consortium).
1993-1995	University of Michigan Medical Center, Division of Child and Adolescent Psychiatry, Department of Psychiatry, Psychology Intern (APA Accredited through University's Captive Consortium).

PUBLICATIONS (91): http://www.ncbi.nlm.nih.gov/sites/myncbi/1NSkUvt-678QZ/bibliography/48519024/public/?sort=date&direction=ascending

Gutierrez, P. M. (in press). Introduction to the special section: The costs and benefits of working with pooled data. *Military Behavioral Health.* doi: 10.1080/21635781.2015.1085932

Villate, J., O'Connor, S., Leitner, R., Kerbrat, A., Johnson, L., and Gutierrez, P. M. (in press). Suicide attempt characteristics among veterans and active duty servicemembers: A pooled data analysis. *Military Behavioral Health.*

Joiner, T., Hom, M., Rogers, M., Chu, C., Stanley, I., Wynn, G., & Gutierrez, P. M. (in press). Staring Down Death: Is Abnormally Slow Blink Rate a Clinically Useful Indicator of Acute Suicide Risk? *Crisis.*

Gutierrez, P. M., Davidson, C., Friese, A., & Forster, J. (in press). Physical Activity, Suicide Risk Factors, and Suicidal Ideation in a Veteran Sample. *Suicide and Life-Threatening Behavior.*

Davidson, C. L., Anestis, M., & Gutierrez, P. M. (in press). Ecological momentary assessment is a neglected methodology in suicidology. *Archives of Suicide Research.*

Tucker, R. P.**,** Crowley, K., Davidson, C. L., & Gutierrez, P. M. (2015). Risk factors, warning signs, and drivers of suicide: What are they, how do they differ, and why does it matter? *Suicide and Life-Threatening Behavior, [Epub ahead of print].* doi: 10.1111/sltb.12161

Petrik, M. L., Gutierrez, P. M., Berlin, J. S., & Saunders, S. M. (2015). Barriers and Facilitators of Suicide Risk Assessment in Emergency Departments: A Qualitative Study of Provider Perspectives. *General Hospital Psychiatry, [Epub ahead of print].* doi: 10.1016/j.genhosppsych.2015.06.018

Anestis, M. D., Joiner, T., Hanson, J. E., & Gutierrez, P. M. (2015). Response to commentary on the modal suicide decedent did not consume alcohol just prior to the time of death: An analysis with implications for understanding suicidal behavior. *Journal of Abnormal Psychology, 124(2),* 460-461. doi: 10.1037/abn0000062

Bodell, L., Forney, K. J., Keel, P., Gutierrez, P., & Joiner, T. E. (2014). Consequences of Making Weight: A Review of Eating Disorder Symptoms and Diagnoses in the United States Military. *Clinical Psychology: Science and Practice, 21(4),* 398-409. PMID: 25642105

Anestis, M. D., Soberay, K. A., Hernández, T. D., Joiner, T. E., & Gutierrez, P. M. (2014). Reconsidering the link between impulsivity and suicidal behavior. *Personality and Social Psychology Review, 18 (4),* 366-386. doi: 10.1177/1088868314535988

Anestis, M. D., Joiner, T., Hanson, J. E., & Gutierrez, P. M. (2014). The modal suicide decedent did not consume alcohol just prior to the time of death: An analysis with implications for understanding suicidal behavior. *Journal of Abnormal Psychology, 123(4),* 835-840. doi: 10.1037/a0037480

Johnson, L. L., O'Connor, S.S., Kaminer, B., Jobes, D. A., & Gutierrez, P. M. (2014). Suicide-Focused Group Therapy for Veterans. *Military Behavioral Health, 0*, 1-10. DOI: 10.1080/21635781.2014.963762

Rings, J. A., Forster, J., E., & Gutierrez, P. M. (2014). Exploring Prolonged Grief Disorder and its Relationship to Suicidal Ideation among Veterans. *Military Behavioral Health, 2(3)*, 283-292. DOI: 10.1080/21635781.2014.963758

Ribeiro, J.D., Bender, T. W., Buchman, J. M., Nock, M. K., Rudd, M. D., Bryan, C.J., Lim, I. C., Baker, M. T., Knight, C., Gutierrez, P. M., & Joiner, T. E. Jr. (2014). An investigation of the interactive effects of the acquired capability for suicide and acute agitation on suicidality in a military sample. *Depression and Anxiety, 00,* 1-7. DOI: 10.1002/da.22240

Matarazzo, B. B., Barnes, S. M., Pease, J. L., Russell, L. M., Hanson, J. E., Soberay, K. A., & Gutierrez, P. M. (2014). Suicide risk among lesbian, gay, bisexual, and transgender military personnel and veterans: What does the literature tell us? *Suicide and Life-Threatening Behavior, 44(2),* 200-217. Doi: 10.1111/sltb.12073

Osman, A., Lamis, D. A., Freedenthal, S., Gutierrez, P. M., & McNaughton-Cassill, M. (2014). The Multidimensional Scale of perceived Social Support: Analyses of internal reliability, measurement invariance, and correlates across genders. *Journal of Personality Assessment, 96(1)*, 103-112. doi: 10.1080/00223891.2013.838170

Gutierrez, P. M., Brenner, L. A., Rings, J. A., Devore, M. D., Kelly, P. J., Staves, P. J., Kelly, C. M., & Kaplan, M. S. (2013). A qualitative description of female veterans' deployment-related experiences and potential suicide risk factors. *Journal of Clinical Psychology, 69(3),* 923-935. doi: 10.1002/jclp.21997

York, J., Lamis, D. A., Friedman, L., Berman, A. L., Joiner, T. E., McIntosh, J. L., Silverman, M. M., Konick, L., Gutierrez, P. M., & Pearson, J. (2013). A systematic review process to evaluate suicide prevention programs: A sample case of community-based programs. *Journal of Community Psychology, 41(1),* 35-51.

Osman, A., Wong, J. L., Bagge, C. L., Freedenthal, S., Gutierrez, P. M., & Lozano, G. (2012). The Depression Anxiety Stress Scales—21 (DASS-21): Further examination of dimensions, scale reliability, and correlates. *Journal of Clinical Psychology, 68(12),* 1322-1338. doi: 10.1002/jclp.21908

Bahraini, N. H., Gutierrez, P. M., Harwood, J. E., Huggins, J. A., Hedegaard, H., Chase, M., & Brenner, L. A. (2012). The Colorado Violent Death Reporting System (COVDRS): Validity and utility of the Veteran status variable. *Public Health Reports, 127,* 304-309. PMID: 22547861

Rings, J. A., Alexander, P. A, Silvers, V. N., & Gutierrez, P. M. (2012). Adapting the safety planning intervention for use in a Veteran psychiatric inpatient group setting. *Journal of Mental Health Counseling,* 34(2), 95-110.

Gutierrez, P. M., Freedenthal, S., Wong, J. L., Osman, A., & Norizuki, T. (2012). Validation of the Suicide Resilience Inventory-25 (SRI-25) in adolescent psychiatric inpatient samples. *Journal of Personality Assessment,* 94(1), 53-61. doi:10.1080/00223891.2011.608755

Ribeiro, J. D., Pease, J. L., Gutierrez, P. M., Silva, C., Bernert, R. A., Rudd, M. D., & Joiner, T. E. Jr. (2012). Sleep problems outperform depression and hopelessness as cross-sectional and longitudinal predictors of suicidal ideation and behavior in young adults in the military. *Journal of Affective Disorders, 136,* 743-750. doi:10.1016/j.jad.2011.09.049

Osman, A., Bagge, C. L., Freedenthal, S., Gutierrez, P. M., & Emmerich, A. (2011). Development and evaluation of the Social Anxiety and Depression Life Interference-24 (SADLI-24) Inventory. *Journal of Clinical Psychology, 67(1),* 82-89. doi:10.1002/jclp.20728

Freedenthal, S., Lamis, D. A., Osman, A., Kahlo, D., & Gutierrez, P. M. (2011). Evaluation of the psychometric properties of the Interpersonal Needs Questionnaire-12 in samples of men and women. *Journal of Clinical Psychology, 67,* 609-623. doi:10.1002/jclp.20782

Osman, A., Freedenthal, S., Gutierrez, P. M., Wong, J. L., Emmerich, A., & Lozano, G. (2011). The Anxiety Depression Distress Inventory-27 (ADDI-27): A Short Version of the Mood and Anxiety Symptom Questionnaire-90. *Journal of Clinical Psychology, 67,* 591-608. doi:10.1002/jclp.20784

Osman, A., Gutierrez, P. M., Wong, J. L., Freedenthal, S., Bagge, C. L., & Smith, K. D. (2010). Development and Psychometric Evaluation of the Suicide Anger Expression Inventory—28. *Journal of Psychopathology and Behavioral Assessment, 32,* 595–608. doi:10.1007/s10862-010-9186-5

Osman, A., Gutierrez, P. M., Bagge, C. L., Fang, Q., & Emmerich, A. (2010). Reynolds Adolescent Depression Scale—Second Edition: A reliable and useful instrument. *Journal of Clinical Psychology, 66(12),* 1324-1345. doi: 10.1002/jclp.20727

Wortzel, H. S., Gutierrez, P. M., Homaifar, B. Y., Breshears, R. E., & Harwood, J. E. (2010). Surrogate endpoints in suicide research. *Suicide and Life-Threatening Behavior, 40(5)*, 500-505. doi:10.1521/suli.2010.40.5.500

Breshears, R. E., Brenner, L. A., Harwood, J. E. F., & Gutierrez, P. M. (2010). Predicting suicidal behavior in veterans with traumatic brain injury: The utility of the Personality Assessment Inventory. *Journal of Personality Assessment, 92(4),* 349-355. doi:10.1080/00223891.2010.482011

Muehlenkamp, J. J., Cowles, M. L., & Gutierrez, P. M. (2010). Validity of the Self-Harm Behavior Questionnaire with diverse adolescents. *Journal of Psychopathology and Behavioral Assessment, 32,* 236-245. doi:10.1007/s10862-009-9131-7

Brenner, L. A., Terrio, H., Homaifar, B. Y., Gutierrez, P. M., Staves, P. J., Harwood, J. E. F., Reeves, D., Adler, L. E., Ivins, B. J., Helmick, K., & Warden, D. (2010). Neuropsychological test performance in soldiers with blast-related mild TBI. *Neuropsychology, 24(2),* 160-167. doi:10.1037/a0017966

Selby, E. A., Anestis, M. D., Bender, T. W., Ribeiro, J. D, Nock, M. K., Rudd, M. D., Bryan, C. J., Lim, I. C., Baker, M. T., Gutierrez, P. M., & Joiner, T. E., Jr. (2010). Overcoming the fear of lethal injury: Evaluating suicide in the military through the lens of the interpersonal-psychological theory of suicide. *Clinical Psychology Review, 30,* 298-307. doi:10.1016/j.cpr.2009.12.004

Osman, A., Gutierrez, P. M., Smith, K., Fang, Q., Lozano, G., & Devine, A. (2010). The Anxiety Sensitivity Index-3: Analyses of Dimensions, Reliability Estimates, and Correlates in Nonclinical Samples. *Journal of Personality Assessment, 92(1),* 45-52. doi:10.1080/00223890903379332

Osman, A., Gutierrez, P. M., Schweers, R., Fang, Q., Holguin-Mills, R. L., & Cashin, M. (2010). Psychometric Evaluation of the Body Investment Scale for Use with Adolescents. *Journal of Clinical Psychology, 66(3),* 259-276. doi:10.1002/jclp.20649

Osman, A., Gutierrez, P. M., Barrios, F., Wong, J. L., Freedenthal, S., & Lozano, G. (2010). Development and Initial Psychometric Properties of the UTSA Future Disposition Inventory. *Journal of Clinical Psychology, 66(4)*, 1-20. doi: 10.1002/jclp.20660

Brausch, A. M. & Gutierrez, P. M. (2010). Differences in Non-Suicidal Self-Injury and Suicide Attempts in Adolescents. *Journal of Youth and Adolescence, 39,* 233-242. doi:10.1007/s10964-009-9482-0

Gutierrez, P. M. (2009). Suicidal thoughts: Essays on self-determined death [Review of the book]. *American Journal of Psychiatry, 166(9),* 1069-1070. doi:10.1176/appi.ajp.2009.09030305

Gutierrez, P. M., Brenner, L. A., Olson-Madden, J. H., Breshears, R., Homaifar, B. Y., Betthauser, L. M., Staves, P., & Adler, L. E. (2009). Consultation as a means of veteran suicide prevention. *Professional Psychology: Research and Practice, 40(6)*, 586-592. doi:10.1037/a0016497

Muehlenkamp, J. J., Williams, K. L., Gutierrez, P. M., & Claes, L. (2009). Rates of non-suicidal self-injury in high school students across five years. *Archives of Suicide Research, 13(4)*, 317-329. doi:10.1080/13811110903266368

Osman, A., Williams, J. E., Espenschade, K., Gutierrez, P. M., Bailey, J. R., & Chowdhry, O. (2009). Further evidence of the reliability and validity of the Multidimensional Anxiety Scale for Children (MASC) in Psychiatric inpatient samples. *Journal of Psychopathology and Behavioral Assessment, 31,* 202-214. doi: 10.1007/s10862-008-9095-z

Gutierrez, P. M., & Osman, A. (2009). Getting the best return on your screening investment: An analysis of the Suicidal Ideation Questionnaire and Reynolds Adolescent Depression Scale. *School Psychology Review, 38,* 200-217.

Gutierrez, P. M., & Brenner, L. A. (2009). Introduction to the special section: Helping military personnel and veterans from Operation Enduring Freedom and Operation Iraqi Freedom (OEF/OIF) manage stress reactions. *Journal of Mental Health Counseling, 31(2)*, 95-100.

Homaifar, B. Y., Brenner, L. A., Gutierrez, P. M., Harwood, J. F., Thompson, C., Filley, C. M., Kelly, J. P., & Adler, L. E. (2009). Sensitivity and specificity of the Beck Depression Inventory-II (BDI-II) in individuals with traumatic brain injury (TBI). *Archives of Physical Medicine and Rehabilitation, 90(4),* 652-656. doi:10.1016/j.apmr.2008.10.028

Brausch, A. M., & Gutierrez, P. M. (2009). The role of body image and disordered eating as risk factors for depression and suicide ideation in adolescents. *Suicide and Life-Threatening Behavior, 39(1),* 58-71. doi:10.1521/suli.2009.39.1.58

Gutierrez, P. M., Brenner, L. A., & Huggins, J. A. (2008). A preliminary investigation of suicidality in psychiatrically hospitalized veterans with traumatic brain injury. *Archives of Suicide Research, 12(4)*, 336–343. doi:10.1080/13811110802324961

Brenner, L. A., Gutierrez, P. M., Cornette, M. M., Betthauser, L. M., Bahraini, N., & Staves, P. J. (2008). A qualitative study of potential suicide risk factors in returning combat veterans. *Journal of Mental Health Counseling, 30(3),* 211-225.

Osman, A., Barrios, F. X., Gutierrez, P. M., Williams, J. E., & Bailey, J. (2008). Psychometric properties of the Beck Depression Inventory-II in nonclinical adolescent samples. *Journal of Clinical Psychology, 64,* 83-102. doi:10.1002/jclp.20433

Homaifar, B. Y., Brenner, L. A., Gutierrez, P. M., Harwood, J. E. F., Thompson, C., Filley, C. M., Kelly, J. P., & Adler, L. E. (2007, June). Aging with traumatic brain injury: An analysis of Beck Depression Inventory-II scores [Abstract]. *The Clinical Neuropsychologist*, *21(3)*, 395-396.

Thompson, C., Gutierrez, Brenner, L. A., Homaifar, B. Y., & Harwood, J. E. F. (2007, June). Veterans with traumatic brain injury: Preliminary norms for the Personality Assessment Inventory [Abstract]. *The Clinical Neuropsychologist*, *21(3)*, 406-407.

Muehlenkamp, J. J., & Gutierrez, P. M. (2007). Risk for suicide attempts among adolescents who engage in non-suicidal self-injury. *Archives of Suicide Research, 11(1)*, 69-82. doi:10.1080/13811110600992902

Fliege, H., Kocalevent, R., Walter, O. B., Beck, S., Gratz, K. L., Gutierrez, P. M., & Klapp, B. F. (2006). Three assessment tools for deliberate self-harm and suicide behavior: Evaluation and psychopathological correlates. *Journal of Psychosomatic Research, 61(1)*, 113-121. doi:10.1016/j.jpsychores.2005.10.006

Osman, A., Barrios, F. X., Kopper, B. A., Gutierrez, P. M., Williams, J. E., & Bailey, J. (2006). The Body Influence Assessment Inventory (BIAI): Development and initial validation. *Journal of Clinical Psychology, 62(7)*, 923-942. doi:10.1002/jclp.20273

Gutierrez, P. M. (2006). Integratively assessing risk and protective factors for adolescent suicide. *Suicide and Life-Threatening Behavior, 36(2),* 129-135. doi:10.1521/suli.2006.36.2.129

Gutierrez, P. M., Muehlenkamp, J. J., Konick, L. C., & Osman, A. (2005). What role does race play in adolescent suicidal ideation? *Archives of Suicide Research, 9(2),* 177-192. doi:10.1080/13811110590904025

Osman, A., Gutierrez, P. M., Barrios, F. X., Bagge, C. L., Kopper, B. A., & Linden, S. (2005). The Inventory of Suicide Orientation - 30: Further validation with adolescent psychiatric inpatients. *Journal of Clinical Psychology, 61(4),* 481-497. doi:10.1002/jclp.20086

Muehlenkamp, J. J., Gutierrez, P. M., Osman, A., & Barrios, F. X. (2005). Validation of the Positive and Negative Suicide Ideation (PANSI) Inventory in a diverse sample of young adults. *Journal of Clinical Psychology, 61(4),* 431-445. doi:10.1002/jclp.20051

Konick, L. C., & Gutierrez, P. M. (2005). Testing a model of suicide ideation in college students. *Suicide and Life-Threatening Behavior, 35*(2), 181-192. doi:10.1521/suli.35.2.181.62875

Osman, A., Barrios, F. X., Gutierrez, P. M., Schwarting, B., Kopper, B. A., & Wang, M. C. (2005). Reliability and construct validity of the pain distress inventory. *Journal of Behavioral Medicine, 28*, 169-180. doi:10.1007/s10865-005-3666-1

Osman, A., Kopper, B. A., Barrios, F. X., Gutierrez, P. M., & Bagge, C. L. (2004). Reliability and validity of the Beck Depression Inventory – II with adolescent psychiatric inpatients. *Psychological Assessment, 16(2),* 120-132. doi:10.1037/1040-3590.16.2.120

Gutierrez, P. M., Watkins, R., & Collura, D. (2004). Suicide risk screening in an urban high school. *Suicide and Life-Threatening Behavior, 34(4)*, 421-428. doi: 10.1521/suli.34.4.421.53741

Osman, A., Gutierrez, P. M., Muehlenkamp, J. J., Dix-Richardson, F., Barrios, F. X., & Kopper, B. A. (2004). The Suicide Resilience Inventory – 25: Development and preliminary psychometric properties. *Psychological Reports, 94,* 1349-1360. doi:10.2466/PR0.94.3.1349-1360

Gutierrez, P. M., Osman, A., Kopper, B. A., & Barrios, F. X. (2004). Appropriateness of the Multi-Attitude Suicide Tendency Scale for non-white individuals. *Assessment, 11(1),* 73-84. doi:10.1177/1073191103261041

Muehlenkamp, J. J., & Gutierrez, P. M. (2004). An investigation of differences between self-injurious behavior and suicide attempts in a sample of adolescents. *Suicide and Life-Threatening Behavior, 34(1),* 12-23. doi:10.1521/suli.34.1.12.27769

Osman, A., Barrios, F. X., Gutierrez, P. M., Kopper, B. A., Butler, A., & Bagge, C. L. (2003). The Pain Distress Inventory: Development and initial psychometric properties. *Journal of Clinical Psychology, 59(7),* 767-785. doi:10.1002/jclp.10173

Osman, A., Gutierrez, P. M., Jiandani, J., Kopper, B. A., Barrios, F. X., Linden, S. C., & Truelove, R. S. (2003). A preliminary validation of the Positive and Negative Suicide Ideation (PANSI) Inventory with normal adolescent samples. *Journal of Clinical Psychology, 59(4),* 493-512. doi:10.1002/jclp.10154

Watkins, R. L., & Gutierrez, P. M. (2003). The relationship between exposure to adolescent suicide and subsequent suicide risk. *Suicide and Life-Threatening Behavior, 33 (1),* 21-32. doi:10.1521/suli.33.1.21.22787

Osman, A., Breitenstein, J. L., Barrios, F. X., Gutierrez, P. M., & Kopper, B. A. (2002). The Fear of Pain Questionnaire-III: Further reliability and validity with nonclinical samples. *Journal of Behavioral Medicine, 25(2),* 155-173.

Osman, A., Barrios, F. X., Gutierrez, P. M., Wrangham, J. J., Kopper, B. A., Truelove, R. S., & Linden, S. C. (2002). The Positive and Negative Suicide Ideation (PANSI) Inventory: Psychometric evaluation with adolescent psychiatric inpatient samples. *Journal of Personality Assessment, 79(3),* 512-530. doi:10.1207/S15327752JPA7903_07

Valentiner, D. P., Gutierrez, P. M., & Blacker, D. (2002). Anxiety measures and their relationship to adolescent suicidal ideation and behavior. *Journal of Anxiety Disorders, 16,* 11-32. doi:10.1016/S0887-6185(01)00086-X

Deacon, B. J., Valentiner, D. P., Gutierrez, P. M., & Blacker, D. (2002). The Anxiety Sensitivity Index for Children: Factor structure and relation to panic symptoms in an adolescent sample. *Behaviour Research and Therapy, 40(7),* 839-852. doi:10.1016/S0005-7967(01)00076-6

Gutierrez, P. M., Osman, A., Barrios, F. X., Kopper, B. A., Baker, M. T., & Haraburda, C. M. (2002). Development of the Reasons for Living Inventory for Young Adults. *Journal of Clinical Psychology, 58(4),* 339-357. doi:10.1002/jclp.1147

Gutierrez, P. M., Osman, A., Barrios, F. X., & Kopper, B. A. (2001). Development and initial validation of the Self-Harm Behavior Questionnaire. *Journal of Personality Assessment, 77(3),* 475-490. doi:10.1207/S15327752JPA7703_08

Osman, A., Bagge, C. L., Gutierrez, P. M., Konick, L. C., Kopper, B. A., & Barrios, F. X. (2001). The Suicidal Behaviors Questionnaire - Revised (SBQ-R): Validation with clinical and non-clinical samples. *Assessment, 8,* 445-455. doi:10.1177/107319110100800409

Osman, A., Chiros, C. E., Gutierrez, P. M., Kopper, B. A., & Barrios, F. X. (2001). Factor structure and psychometric properties of the Brief Mizes Anorectic Cognitions Questionnaire. *Journal of Clinical Psychology, 57(6),* 785-799. doi:10.1002/jclp.1049

Osman, A., Gutierrez, P. M., Downs, W. R., Kopper, B. A., Barrios, F. X., & Haraburda, C. M. (2001). Development and psychometric properties of the Student Worry Questionnaire-30. *Psychological Reports, 88,* 277-290. doi:10.2466/PR0.88.1.277-290

Gutierrez, P. M., Rodriguez, P. J., & Garcia, P. (2001). Suicide risk factors for young adults: Testing a model across ethnicities. *Death Studies, 25(4),* 319-340. doi:10.1080/07481180151143088

Osman, A., Gilpin, A. R., Panak, W. F., Kopper, B. A., Barrios, F. X., Gutierrez, P. M., & Chiros, C. E. (2000). The Multi-Attitude Suicide Tendency Scale: Further validation with adolescent psychiatric inpatients. *Suicide and Life-Threatening Behavior, 30(4),* 377-385.

Gutierrez, P. M., Thakkar, R. R., & Kuczen, C. L. (2000). Exploration of the relationship between physical and/or sexual abuse, attitudes about life and death, and suicidal ideation in young women. *Death Studies, 24(8),* 675-688. doi:10.1080/07481180151143088

Thakkar, R. R., Gutierrez, P. M., Kuczen, C. L., & McCanne, T. R. (2000). History of physical and/or sexual abuse and current suicidality in college women. *Child Abuse & Neglect, 24(10),* 1345-1354. doi:10.1016/S0145-2134(00)00187-3

Gutierrez, P. M., Osman, A., Kopper, B. A., Barrios, F. X., & Bagge, C. L. (2000). Suicide risk assessment in a college student population. *Journal of Counseling Psychology, 47(4),* 403-413. doi:10.1037//0022-0167.47.4.403

McGrath, P. B., Gutierrez, P. M., & Valadez, I. M. (2000). Introduction of the College Student Social Support Scale (CSSSS): Factor structure and reliability assessment. *Journal of College Student Development, 41(4),* 415-426.

Osman, A., Barrios, F. X., Gutierrez, P. M., Kopper, B. A., Merrifield, T., & Grittmann, L. (2000). The Pain Catastrophizing Scale: Further psychometric evaluation with adult samples. *Journal of Behavioral Medicine, 23,* 351-365.

Gutierrez, P. M., Osman, A., Kopper, B. A., & Barrios, F. X. (2000). Why young people do not kill themselves: The Reasons for Living Inventory for Adolescents. *Journal of Clinical Child Psychology, 29(2),* 177-187. doi:10.1207/S15374424jccp2902_4

Gutierrez, P. M. (1999). Suicidality in parentally bereaved adolescents. *Death Studies, 23(4),* 359-370. doi:10.1080/074811899201000

Osman, A., Kopper, B. A., Linehan, M. M., Barrios, F. X., Gutierrez, P. M., & Bagge, C. L. (1999). Validation of the Adult Suicidal Ideation Questionnaire and the Reasons for Living Inventory in an adult psychiatric inpatient sample. *Psychological Assessment, 11(2),* 115-123. doi:10.1037//1040-3590.11.2.115

Osman, A., Gutierrez, P. M., Barrios, F. X., Kopper, B. A., & Chiros, C. E. (1998). The Social Phobia and Social Interaction Anxiety Scales: Evaluation of psychometric properties. *Journal of Psychopathology and Behavioral Assessment, 20(3),* 249-264. doi: 10.1023/A:1023067302227

Osman, A., Gutierrez, P. M., Kopper, B. A., Barrios, F. X., & Chiros, C. E. (1998). The Positive and Negative Suicide Ideation Scale: Development and validation. *Psychological Reports, 28,* 783-793.

Gutierrez, P. M., & Silk, K. R. (1998). Prescription privileges for psychologists: A review of the psychological literature. *Professional Psychology: Research and Practice, 29(3),* 213-222. doi:10.1037//0735-7028.29.3.213

Hagstrom, A. H., & Gutierrez, P. M. (1998). Confirmatory factor analysis of the Multi-Attitude Suicide Tendency Scale. *Journal of Psychopathology and Behavioral Assessment, 20(2),* 173-186.

Osman, A., Downs, W. R., Barrios, F. X., Kopper, B. A., Gutierrez, P. M., & Chiros, C. E. (1997). Factor structure and psychometric characteristics of the Beck Depression Inventory-II. *Journal of Psychopathology and Behavioral Assessment, 19(4),* 359-376. doi:10.1007/BF02229026

Gutierrez, P., King, C. A., & Ghazziudin, N. (1996). Adolescent attitudes about death in relation to suicidality. *Suicide and Life-Threatening Behavior, 26(1),* 8-18.

BOOK/CHAPTERS (8):

Jobes, D. A., Comtois, K. A., Brenner, L. A., Gutierrez, P. M., & O'Connor, S. S. (in press). Lessons learned from clinical trials of the Collaborative Assessment and Management of Suicidality (CAMS). In R. O'Connor, S. Platt, & J. Gordon (Eds.), *International handbook of suicide prevention: Research, policy, and practice, 2nd Edition*. West Sussex, UK: Wiley-Blackwell.

Gutierrez, P. M., Brenner, L. A., Wortzel, H., Harwood, J. E. F., Leitner, R., Rings, J., & Bartlett, S. (2012). Blister packaging medication to increase treatment adherence and clinical response: Impact on suicide-related morbidity and mortality. In J. E. Lavigne (Ed.), *Frontiers in suicide risk: Research, Treatment and Prevention*. Hauppauge, NY: Nova Science Publishers, Inc.

Brenner, L. A., Gutierrez, P. M., Huggins, J., & Olson-Madden, J. (2011). Suicide and traumatic brain injury. In A. L. Berman & M. Pompili (Eds.), *Medical conditions associated with suicide risk* (pp. 299-307). Washington, DC: American Association of Suicidology.

Osman, A., Freedenthal, S., Fang, Q., Willis, J., Norizuki, T., & Gutierrez, P. M. (2011). The UTSA Future Disposition Inventory: Further analyses of reliability, validity, and potential correlates in non-clinical samples. In A. M. Columbus (Ed.), *Advances in Psychology Research, Volume 85* (pp. 51-70). New York, NY: Nova Science Publishers.

Gutierrez, P. M., & Brenner, L. A. (2011). Highlight section: Helping military personnel/Veterans and families manage stress reactions and navigate reintegration. In A. J. Palmo, W. J. Weikel, & D. P. Borsos (Eds.), *Foundations of mental health counseling, 4th Edition*. Springfield, IL: Charles C. Thomas Publisher, Inc.

Gutierrez, P. M. (2011). The accidental suicidologist. In M. Pompili (Ed.), *Suicide in the words of suicidologists*. Hauppauge, NY: Nova Science Publishers, Inc.

Jobes, D. A., Comtois, K. A., Brenner, L. A., & Gutierrez, P. M. (2011). Clinical trial feasibility studies of the Collaborative Assessment and Management of Suicidality (CAMS). In R. O'Connor, S. Platt, & J. Gordon (Eds.), *International handbook of suicide prevention: Research, policy, and practice*. (pp. 383-400). West Sussex, UK: Wiley-Blackwell.

Gutierrez, P. M., & Osman, A. (2008). *Adolescent suicide: An integrated approach to assessment of risk and protective factors.* DeKalb, IL: Northern Illinois University Press.

PAPER PRESENTATIONS (68):

Gutierrez, P. M., & Joiner, T. The Military Suicide Research Consortium: Clinical trials reducing suicide risk and increasing resilience. Presented at the Military Health Systems Research Symposium, Fort Lauderdale, FL, August 19, 2015.

Gutierrez, P. M. Advances in understanding suicide in the US military. Presented at the International Association for Suicide Prevention conference, Montreal, QC, Canada, June 18, 2015.

Cornette, M., Wintersteen, M., Gutierrez, P. M., Reidenberg, D., & McKeon, R. Youth warning signs for suicide: Results of a national expert consensus panel. Presented at the American Association of Suicidology annual conference, Atlanta, GA, April 17, 2015.

Crowley, K. J., Tucker, R., Davidson, C., & Gutierrez, P. M. Connecting over what "drives" suicide: Defining suicide-specific drivers and their utility for clinical risk. Presented at the American Association of Suicidology annual conference, Atlanta, GA, April 17, 2015.

Anestis, M., Bradley, B., Cornette, M., Denneson, L., & Gutierrez, P. M. On the front lines of military suicidology. Presented at the American Association of Suicidology annual conference, Atlanta, GA, April 17, 2015.

Crowley, K. J., Ballard, E., Tucker, R., Davidson, C., May, A. E., Klonsky, E. D., & Gutierrez, P. M. Improving imminent risk assessment: Conceptual and empirical considerations. Presented at the American Association of Suicidology annual conference, Atlanta, GA, April 16, 2015.

Gutierrez, P. M., & Shelef, L. (2015, March). Predictive Validity of Suicide-specific Measures. Shoresh military medicine conference, Ramat Gan, Israel.

Gutierrez, P. M., & Joiner, T. (2015, March). Military Suicide Research Consortium Treatment Studies. Shoresh military medicine conference, Ramat Gan, Israel.

Gutierrez, P. M. Veteran suicide risk assessment. Grand Rounds presentation at the University of Mississippi Medical Center, Department of Psychiatry and Human Behavior, Jackson, MS, September 5, 2014.

Gutierrez, P. M. Veteran suicide risk assessment. Presented at the American Psychological Association convention, Washington, DC, August 8, 2014.

Gutierrez, P. M. Is alcohol use really a direct risk factor for suicide? Presented at the Show Me You Care About Suicide Prevention Conference, Jefferson City, MO, July 15, 2014.

Gutierrez, P. M. Providing for our youngest Veterans: Similarities and Differences in College Student and Veteran Suicide Prevention Efforts. Presented at the Preventing Suicide Among Youth and Young Adults conference, Springfield, IL, April 25, 2014.

Chesin, M. S., Hughes, J., Andover, P., & Gutierrez, P. M. Developing and testing three novel adjunctive psychosocial interventions to prevent suicide and non-suicidal self-injury: An overview of the interventions, lessons learned, and preliminary outcomes. Presented at the American Association of Suicidology conference, Los Angeles, CA, April 10, 2014.

O'Connor, S. S., Villatte, J., & Gutierrez, P. M. Differences in characteristics of suicide attempts between active duty military personnel and veterans. Presented at the American Association of Suicidology conference, Los Angeles, CA, April 11, 2014.

Gutierrez, P.M. Toward a gold standard for suicide risk assessment for military personnel. Presented at the International Association for Suicide Prevention Congress, Oslo, Norway, September 27, 2013.

Gutierrez, P. M., Joiner, T., Blatt, A., & Castro, C. United States military suicide prevention research: Navigating challenges and capitalizing on opportunities. Presented at the International Academy of Suicide Research World Congress on Suicide, Montreal, Quebec, Canada, June 12, 2013.

Goodman, M., Gutierrez, P. M., Bossarte, R., Rasmusson, A. M., Brenner, L., & Stanley. B. Research updates and new directions for suicide prevention in the Veterans Administration. Discussant for symposium presented at the American Psychiatric Association annual meeting, San Francisco, CA, May, 19, 2013.

Gutierrez, P. M. Alcohol and suicide: A deadly cocktail or misinterpretation of data? Plenary address presented at the American Association of Suicidology conference, Austin, TX, April 26, 2013.

Gutierrez, P. M., Joiner, T., & Castro, C. Preventing suicide in the United States military: Research challenges and opportunities. Presented at the 14th European Symposium of Suicide & Suicidal Behavior, Tel Aviv-Jaffa, Israel, September 5, 2012.

Gutierrez, P. M., Castro, C., Fitek, D. J., Holloway, M., & Jobes, D. A. Status of DoD funded suicide research. Presented at the Annual DoD/VA Suicide Prevention Conference, Washington, DC, June 20, 2012.

Matarazzo, B., Gutierrez, P. M., & Silverman, M. M. The Self-Directed Violence Classification System: What it is and why it matters. Presented at the Annual DoD/VA Suicide Prevention Conference, Washington, DC, June 20, 2012.

Gutierrez, P. M., Fitek, D. J., Joiner, T., Holloway, M., Jobes, D., & Rudd, M. D. Status of Department of Defense funded suicide research. Featured Panel presentation at the American Association of Suicidology conference, Baltimore, MD, April 20, 2012.

Gutierrez, P. M. Navigating IRBs as a suicide researcher. Presented at the American Association of Suicidology conference, Baltimore, MD, April 19, 2012.

Kemp, J., Thompson, C., Brown, G. K., Brenner, L. A., & Gutierrez, P. M. VA continuum of care for suicidal Veterans. Panel presentation at the American Association of Suicidology conference, Portland, OR, April 16, 2011.

Gutierrez, P. M., & Lineberry, T. United States Army Medical Research and Materiel Command United States military suicide research: Activities and opportunities. Panel presentation at the American Association of Suicidology conference, Portland, OR, April 14, 2011.

Bahraini, N., Gutierrez, P. M., Brenner, L. A., Hedegaard, H., & Huggins, J. The Colorado Violent Death Reporting System (COVDRS): Exploring factors associated with suicide in VA and non-VA services utilizing Veterans. Presented at the American Association of Suicidology conference, Portland, OR, April 14, 2011.

Marshall, J., Gutierrez, P. M., Lineberry, T., & Jobes, D. United States Army Medical Research and Material Command United States military suicide research activities: Activities and opportunities. Panel presentation at the DOD/VA Annual Suicide Prevention Conference, Boston, MA, March 15, 2011.

Gutierrez, P. M., Bahraini, N., Basham, C. M., Brenner, L. A., Hedegaard, H., Denneson, L. M., & Dobscha, S. K. Lessons learned about veteran suicide from the Colorado and Oregon Violent Death Reporting Systems. Presented at the American Association of Suicidology conference, Orlando, FL, April 22, 2010.

Gutierrez, P. M. Blister packaging medication to increase treatment adherence and clinical response: Impact on suicide related morbidity and mortality. Presented at the 2010 DoD/VA Suicide Prevention Conference, Washington, DC, January 12, 2010.

Gutierrez, P. M. Theater of War. Plenary Panel member at the 2010 DoD/VA Suicide Prevention Conference, Washington, DC, January 12, 2010.

Bahraini, N., Gutierrez, P. M., Brenner, L. A., Hedegaard, H., Chase, M., & Shupe, A. The Colorado violent death reporting system: Exploring factors associated with suicide in VA and non-VA services utilizing veterans. Presented at the Centers for Disease Control and Prevention's NVDRS Reverse Site Visit, Denver, CO, May 14, 2009.

Leach, R. L., Breshears, R. E., Brenner, L. A., Homaifar, B. Y., Gutierrez, P. M., Gorgens, K. M., & Harwood, J. E. F. The utility of the Personality Assessment Inventory for predicting violence in veterans with traumatic brain injury. Presented at the Rehabilitation Psychology Conference, Jacksonville, FL, February 27, 2009.

Gutierrez, P. M. Collaborative assessment and management of suicide (CAMS): A feasibility study. DoD/VA Annual Suicide Prevention Conference, San Antonio, TX, January 13, 2009.

Gutierrez, P. M., Brenner, L. A., Homaifar, B. Y., & Olson-Madden, J. H. VA VISN 19 MIRECC research and clinical efforts at suicide prevention. Symposium presented at the American Psychological Association convention, Boston, MA, August 15, 2008.

Brausch, A. M., & Gutierrez, P. M. Body image and disordered eating in adolescent suicidality. Presented at the American Association of Suicidology conference, Boston, MA, April 17, 2008.

Gutierrez, P. M. Redefining diversity: The chronically suicidal veteran as one example. Presidential address at the American Association of Suicidology conference, Boston, MA, April 17, 2008.

Breshears, R. E., Brenner, L. A., & Gutierrez P. M. Predictive validity of the Personality Assessment Inventory in veterans with traumatic brain injury. Presented at the Rehabilitation Psychology Conference, Tucson, AZ, March 13, 2008.

King, C. A., Gutierrez, P. M., & Jobes, D. A. Looking back – looking ahead: American suicidology at mid-life. Plenary panel presentation at the American Association of Suicidology conference, New Orleans, LA, April 12, 2007.

Mazza, J. J., Reynolds, W. M., & Gutierrez, P. M. Screening for youth suicidal behavior revisited. Panel presentation at the American Association of Suicidology conference, New Orleans, LA, April 12, 2007.

Schumacher, M., Quinnett, P., & Gutierrez, P. M. QPRT suicide risk assessment and management course utility. Panel presentation at the American Association of Suicidology conference, New Orleans, LA, April 12, 2007.

Gutierrez, P. M. Change is good: What the past 40 years tell us about the future. Presidential address at the American Association of Suicidology conference, New Orleans, LA, April 12, 2007.

Gutierrez, P. M. Suicide in the young adult population. Presented at the Department of Veterans Affairs Employee Education System's Evidence-Based Interventions for Suicidal Persons conference, Denver, CO, February 8, 2007.

Rudd, M. D., Berman, L., Silverman, M. M., Gutierrez, P. M., & Schumacher, M. Warning signs for suicide: Theory, research, and clinical applications. Panel presented at the American Association of Suicidology conference, Seattle, WA, April 30, 2006.

Freedenthal, S. L., & Gutierrez, P. M. Adolescents' disclosures of suicidality: Who knows? Presented at the American Association of Suicidology conference, Seattle, WA, April 30, 2006.

Gutierrez, P. M. Shneidman Award Presentation – An integrated approach to assessing risk and protective factors for adolescent suicide. Presented at the American Association of Suicidology conference, Broomfield, CO, April 15, 2005.

Schumacher, M., & Gutierrez, P. M. Bipolar spectrum traits and suicide risk. Presented at the American Association of Suicidology conference, Broomfield, CO, April 15, 2005.

Gutierrez, P. M., & Osman, A. Prediction of adolescent suicide reattempts. Presented at the Kansas Conference in Clinical Child and Adolescent Psychology, Lawrence, KS, October 22, 2004.

Gutierrez, P. M., & Konick, L. C. Evaluation of school-based suicide prevention programs. Presented at the Suicide Prevention: Advancing the Illinois Strategic Plan conference, Springfield, IL, September 23, 2004.

Williams, J. E., Osman, A., Barrios, F., Kopper, B. A., & Gutierrez, P. M. Reliability and validity of the Inventory for Suicide Ideation – 30. Presented at the American Psychological Society conference, Chicago, IL, May 28, 2004.

Hovey, J. D., Freedenthal, S., Gutierrez, P. M., & Fernquist, R. Career development strategies in suicide research #1: Working with a mentor. Panel presented at the American Association of Suicidology conference, Miami, FL, April 15, 2004.

Conwell, Y., Silverman, M., Gutierrez, P. M., Konick, L. C., & Muehlenkamp, J. J. Career development strategies in suicide research #3: Publishing your findings. Workshop presented at the American Association of Suicidology conference, Miami, FL, April 16, 2004.

Konick, L. C., & Gutierrez, P. M. Suicide risk in college students: A test of a model. Presented at the 2004 American Association of Suicidology conference, Miami, FL, April 16, 2004.

Brausch, A. M., & Gutierrez, P. M. Does this magazine make me look fat? Media's impact on body image, depression, and eating. Presented at the Midwestern Psychological Association Conference, Chicago, IL, May 1, 2004.

Muehlenkamp, J. J., Swanson, J., & Gutierrez, P. M. Differences between self-injury and suicide on measures of depression and suicidal ideation. Presented at the Midwestern Psychological Association annual meeting, Chicago, IL, May 9, 2003.

Kaplan, M., Schultz, D., Gutierrez, P. M., Sanddal, N., & Fernquist, N. Suicide research: Working with a mentor. Panel presentation at the American Association of Suicidology annual conference, Santa Fe, NM, April 24, 2003.

Konick, L. C., & Gutierrez, P. M. Is spirituality a moderator of risk for suicide? Presented at the American Association of Suicidology annual conference, Santa Fe, NM, April 25, 2003.

Watkins, R. L., & Gutierrez, P. M. Exposure to peer suicide in college students. Presented at the American Association of Suicidology annual conference, Santa Fe, NM, April 25, 2003.

Gutierrez, P. M., Osman, A., Watkins, R. L., Konick, L. C., Muehlenkamp, J. J., & Brausch, A. M. Development and validation of the Suicide Resilience Inventory - 25 (SRI-25) in clinical and nonclinical samples. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October, 19, 2002.

Konick, L. C., Brausch, A. M., Gutierrez, P. M., & Pawlowski, C. CBT in depressed kids: What factors moderate treatment effectiveness? Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October, 19, 2002.

Hovey, J. D., Gutierrez, P. M., & Jha, A. Measuring cultural risk factors in suicide research. Panel presented at the American Association of Suicidology annual conference, Atlanta, GA, April 19, 2001.

Gutierrez, P. M., Osman, A., Barrios, F. X., & Kopper, B. A. The Self-Harm Behavior Questionnaire. Presented at the American Association of Suicidology annual conference, Atlanta, GA, April 21, 2001.

Gutierrez, P. M., Collura, D., & Watkins, R. A case for regular suicide risk screening in high schools. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October 14, 2000.

Osman, A., Gutierrez, P. M., Kopper, B. A., Barrios, F. X., Breitenstein, J. L., & Silich, N. Validity and utility of the Adolescent Psychopathology Scale (APS) with adolescent psychiatric inpatients. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October 13, 2000.

Kopper, B. A., Gutierrez, P. M., Osman, A., & Barrios, F. X. Helping kids stay alive: The Reasons for Living Inventory - Adolescents. Presented at Western Psychological Association Annual Convention, Portland, OR, April 14, 2000.

Gutierrez, P. M., Rodriguez, P. J., & Foat, N. K. A model of late adolescent suicidality. Presented at the American Association of Suicidology annual conference, Houston, TX, April 15, 1999.

Gutierrez, P. M., Osman, A., Kopper, B. A., & Barrios, F. X. Quality of risk assessment with common measures. Presented at the American Association of Suicidology annual conference, Bethesda, MD, April 18, 1998.

POSTER PRESENTATIONS (54):

Morris, B., O'Connor, S., Johnson, L. L., Jobes, D. A., Gutierrez, P. M., & Kaminer, B. B. Examining group differences between suicidal veterans classified as wish to live, ambivalent, or wish to die using the suicide index score. Presented at the American Association of Suicidology conference, Los Angeles, CA, April 11, 2014.

Davidson, C. L., Babson, K. A., Hostetter, T. A., Crowley, K. J., Forster, J. F., Gutierrez, P. M.. *Exploring the relationship between physical activity and suicide risk among Veterans in the Behavioral Risk Factor Surveillance System Questionnaire.* Poster presented at the Suicide and Self-Injury Special Interest Group at the annual Association of Behavioral and Cognitive Therapies Conference, Nashville, TN, November 22, 2013.

Soberay, K., Dwyer, M., Hanson, J., Ribeiro, J., Gronau, K., Gutierrez, P. M., & Maner, J. Exploring the MSRC common data elements: The relationship between TBI, severe insomnia, and suicidal behaviors in military populations. Presented at the American Psychological Association conference, Honolulu, HI, August 1, 2013.

Pease, J., Soberay, K., Dwyer, M., Gronau, K., & Gutierrez, P. M. Thwarted belonging makes a modest contribution to suicidal ideation after controlling for universalism and relationships. Presented at the American Psychological Association conference, Honolulu, HI, August 1, 2013.

Leitner, R., Gutierrez, P. M., Brenner, L., Wortzel, H., Forster, J. E., & Huggins, J. Psychometric properties of the Self-harm Behavior Questionnaire in Veterans. Presented at the American Psychological Association conference, Honolulu, HI, July 31, 2013.

Dwyer, M. M., Soberay, K., Hanson, J., & Gutierrez, P. M. Military suicide research consortium (MSRC). Presented at the American Association of Suicidology conference, Austin, TX, April 26, 2013.

Rings, J. A., Gutierrez, P. M., Harwood, J. E. F., & Leitner, R. Examining prolonged grief symptomatology and its relationship to self-directed violence among Veterans. Presented at the Veterans Affairs Mental Health Conference. Baltimore, MD, August 23, 2011.

Rings, J. A., Gutierrez, P. M., & Harwood, J. E. F. Prolonged grief disorder and its relationship to self-directed violence among Veterans: Preliminary findings. Presented at the Departments of Defense and Veterans Affairs Suicide Prevention Conference. Boston, MA, March 15, 2011.

Huggins, J., Homaifar, B.Y., Skopp, N.A., Reger, M., Gahm, G., Gutierrez, P., & Brenner, L.A. Suicide prevention through the transformation of data into information. Presented at the Departments of Defense and Veterans Affairs Suicide Prevention Conference. Boston, MA, March 15, 2011.

Betthauser, L. M., Allen, E., Brenner, L. A., & Gutierrez, P. M. Centrality of intimate relationships on failed belongingness and perceived burdensomeness in returning combat Veterans. Presented at the International Association for Relationship Research, Lawrence, KS, November, 2009.

Bahraini, N., Gutierrez, P. M., Brenner, L. A., Huggins, J., Hedegaard, H., Shupe, A., & Chase, M. The Colorado violent death reporting system: Exploring factors associated with suicide in VA and non-VA services utilizing veterans. Presented at the American Psychological Association conference, Toronto, Ontario Canada, August 6, 2009.

Brausch, A. M., & Gutierrez, P. M. Psychosocial factors related to non-suicidal self-injury in adolescents. Presented at the American Association of Suicidology annual conference, San Francisco, CA, April 17, 2009.

Ballard, E. D., Jobes, D., Brenner, L., Gutierrez, P. M., Nagamoto, H., Kemp, J., et al. Qualitative suicide status form responses of suicidal veterans. Presented at the American Association of Suicidology conference, Boston, MA, April 18, 2008.

Bahraini, N., Gutierrez, P. M., Brenner, L. A., Staves, P., Cornette, M., & Betthauser, L. Pain tolerance and links to increased suicide risk. Presented at the American Association of Suicidology conference, Boston, MA, April 18, 2008.

Cornette, M. M., DeBoard, R. L., Clark, D. C., Holloway, R. H., Brenner, L., Gutierrez, P. M., & Joiner, T. E. Examination of an interpersonal-behavioural model of suicide: Toward greater specificity in suicide risk prediction. Presented at the International Association for Suicide Prevention conference, Dublin, Ireland, August 31, 2007.

Brenner, L. A., Gutierrez, P. M., Cornette, M., Staves, P. J., & Betthauser, L. M. Veterans' experiences of habituation to painful stimuli, perceived burdensomeness and failed belongingness. Presented at the American Psychological Association conference, San Francisco, CA, August 19, 2007.

Fang, Q., Choma, K., Salvatore, A., Mack, T., Bailey, J., & Gutierrez, P. M. Validation of the Pain Distress Inventory using an adolescent inpatient sample. Presented at the Kansas Conference in Clinical Child and Adolescent Psychology, Lawrence, KS, October 19, 2006.

Brausch, A. M., & Gutierrez, P. M. Adolescent gender differences in reasons for living. Poster presented at the American Association of Suicidology conference, Seattle, WA, April 30, 2006.

Swanson, J. D., & Gutierrez, P. M. Gender, social support, and student suicidality. Poster presented at the American Association of Suicidology conference, Seattle, WA, April 30, 2006.

Kopper, B. A., Osman, A., Gutierrez, P. M., Williams, J. E., & Barrios, F. X. Suicide Resilience Inventory-25: Validation with normal and adolescent psychiatric inpatients. Poster presented at the 2005 APA conference, Washington, DC.

Kopper, B. A., Osman, A., Barrios, F. X., Gutierrez, P. M., & Williams, J. E. The Beck Depression Inventory-II with nonclinical and inpatient adolescents. Poster presented at the 2005 APA conference, Washington, DC.

Brausch, A. M., & Gutierrez, P. M. Ethnic differences in body image, affect, and eating behaviors and the impact of media exposure. Presented at the Association for the Advancement of Behavior Therapy conference, New Orleans, LA, November 11, 2004.

Muehlenkamp, J. J., & Gutierrez, P. M. Validation of the Self-Harm Behavior Questionnaire in adolescents. Presented at the Association for the Advancement of Behavior Therapy conference, New Orleans, LA, November 11, 2004.

Linden, S., Osman, A., Barrios, F. X., Kopper, B. A., Williams, J. E., & Gutierrez, P. M. Structure of the Adolescent Psychopathology Scale (APS) clinical subscales in psychiatric inpatients. Presented at the Association for the Advancement of Behavior Therapy conference, New Orleans, LA, November 11, 2004.

Osman, A., Williams, J. E., Barrios, F. X., Kopper, B. A., Gutierrez, P. M., Linden, S. C., & Carlson, N. Development of cutoff scores for the Beck scales in adolescent psychiatric inpatients. Presented at

the Kansas Conference in Clinical Child and Adolescent Psychology, Lawrence, KS, October 21, 2004.

Osman, A., Barrios, F. X., Gutierrez, P. M., Kopper, B. A., Williams, J. E., Carlson, N., & Koser, K. Reliability and validity of the Multidimensional Anxiety Scale for Children and the Children's Depression Inventory. Presented at the Kansas Conference in Clinical Child and Adolescent Psychology, Lawrence, KS, October 21, 2004.

Osman, A., Gutierrez, P. M., Barrios, F. X., Kopper, B. A., Linden, S. C., Carlson, N., & Koser, K. The Reynolds Adolescent Depression Scale 2: Reliability and validity. Presented at the Kansas Conference in Clinical Child and Adolescent Psychology, Lawrence, KS, October 21, 2004.

Muehlenkamp, J. J., & Gutierrez, P. M. Are self-injurious behaviors and suicide attempts different points on the same continuum? Presented at the Suicide Prevention: Advancing the Illinois Strategic Plan conference, Springfield, IL, September 23, 2004.

Brausch, A. M., Swanson, J., & Gutierrez, P. M. Parent marital status, depression and suicide. Presented at the American Association of Suicidology conference, Miami, FL, April 16, 2004.

Konick, L. C., Gutierrez, P. M., Muehlenkamp, J. J., Watkins, R. L., Ward, K. E., & Haase, K. Development of the Spiritual Attitudes and Beliefs Inventory: Phase II. Presented at the Midwestern Psychological Association annual meeting, Chicago, IL, May 8, 2003.

Konick, L. C., Gutierrez, P. M., & Watkins, R. L. Adult Suicidal Ideation Questionnaire psychometrics. Presented at the American Association of Suicidology annual conference, Santa Fe, NM, April 25, 2003.

Gutierrez, P. M., & Muehlenkamp, J. J. Understanding differences between self-injurious behavior and suicide attempts in high school students. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October, 18, 2002.

Gutierrez, P. M., Osman, A., Brausch, A. M., Muehlenkamp, J. J., Watkins, R. L., & Konick, L. C. Reliability and validity of the Beck scales in the assessment of suicide-related behaviors in adolescent psychiatric inpatients. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October, 18, 2002.

Gutierrez, P. M., Osman, A., Watkins, R. L., & Muehlenkamp, J. J. Potential racial differences in adolescent suicide risk. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October, 18, 2002.

Osman, A., Gutierrez, P. M., Kopper, B, A., Barrios, F. X., Boyle, T., & Duncan, A. The Inventory of Suicide Orientation - 30: Further validation with adolescent inpatients. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October, 18, 2002.

Osman, A., Linden, S., Gutierrez, P. M., Barrios, F. X., Kopper, B. A., & Forman, K. Validity of the Adolescent Psychopathology Content Scales (APS) in Pediatric Medical Institute for Children (PMIC) inpatients. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October, 18, 2002.

Konick, L. C., Wrangham, J. J., Gutierrez, P. M., Blacker, D., Watkins, R. L., Aalders, G., Giannerini, J., Miller, M. J., Rapp, J. M., Shayne, L. E., & Ward, K. E. Development of the Spiritual Attitudes and Beliefs Inventory (SABI). Presented at the annual meeting of the Midwestern Psychological Association, Chicago, IL, May 2, 2002.

Gutierrez, P. M., Wrangham, J., Konick, L., Osman, A., & Barrios, F. X. Does ethnicity influence adolescent suicide risk? Presented at the American Association of Suicidology annual conference, Bethesda, MD, April 12, 2002.

Wrangham, J., Gutierrez, P. M., Osman, A., & Barrios, F. X. Validation of the PANSI with minority young adults. Presented at the American Association of Suicidology annual conference, Bethesda, MD, April 12, 2002.

Konick, L. C., Brandt, L. A., & Gutierrez, P. M. School-based suicide prevention programs: A meta-analysis. Presented at the American Association of Suicidology annual conference, Bethesda, MD, April 12, 2002.

Gutierrez, P. M., Osman, A., Kopper, B. A., & Barrios, F. X. Use of the Multi-Attitude Suicide Tendency Scale with minority individuals. Presented at the meeting of the Midwestern Psychological Association, Chicago, IL, May 4, 2001.

Valentiner, D., Gutierrez, P. M., Deacon, B., & Blacker, D. Factor structure and incremental validity of the Anxiety Sensitivity Index for Children in an adolescent sample. Presented at the annual meeting of the Society for Research in Child Development, Minneapolis, MN, April 21, 2001.

Gutierrez, P.M., Rodriguez, P. J., & Garcia, P. Minority suicide risk. Presented at the American Association of Suicidology annual conference, Los Angeles, CA, April 13, 2000.

Kopper, B. A., Gutierrez, P. M., Osman, A., Barrios, F. X., Baker, M. T., & Haraburda, C. M. Reasons for Living Inventory for Young Adults: Psychometric properties. Presented for Division 17 - Counseling Psychology - at the annual convention of the American Psychological Association, Washington, DC, August 5, 2000.

Kopper, B. A., Gutierrez, P. M., Osman, A., Barrios, F. X., & Bagge, C. L. Assessment of suicidal ideation in college students. Presented for Division 17 - Counseling Psychology - at the annual convention of the American Psychological Association, Washington, DC, August 5, 2000.

Gutierrez, P. M., Rubin, E. C., & Blacker, D. A preliminary investigation of the role of suicide exposure and attitudes about death on adolescent suicidal ideation. Presented at the Midwestern Psychological Association annual conference, Chicago, IL, May 4, 2000.

Martin, H., & Gutierrez, P. M. The role of mediating factors on the long-term relationship between early parental death and later depression and anxiety. Presented at the Midwestern Psychological Association Annual Conference, Chicago, IL, May 4, 2000.

Kopper, B. A., Osman, A., Gilpin, A. R., Panak, W. F., Barrios, F. X., Gutierrez, P. M., & Chiros, C. E. The Multi-Attitude Suicide Tendency Scale: Further validation with adolescent psychiatric inpatients. Presented at the annual convention of the American Psychological Association, Boston, MA August 22, 1999.

Kopper, B. A., Osman, A., Linehan, M. M., Barrios, F. X., Gutierrez, P. M., & Bagge, C. L. Validation of the Adult Suicide Ideation Questionnaire and the Reasons for Living Inventory in an adult psychiatric inpatient sample. Presented at the annual convention of the American Psychological Association, Boston, MA August 22, 1999.

Osman, A., Bagge, C. L., Barrios, F. X., Gutierrez, P. M., & Kopper, B. A. Receiver operating characteristic curve analyses of the Beck Depression Inventory - II in adolescent psychiatric inpatients. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October 9, 1998.

Osman, A., Bagge, C. L., Gutierrez, P. M., Kopper, B. A., & Barrios, F. X. Validation of the Reasons for Living Inventory for Adolescents (RFL-A) in a clinical sample. Presented at the Kansas Conference in Clinical Child Psychology, Lawrence, KS, October 9, 1998.

Kopper, B. A., Osman, A., Hoffman, J., Gutierrez, P. M., & Barrios, F. X. Reliability and validity of the BDI-II with inpatient psychiatric adolescents. Presented at Division 12 - Clinical Psychology - at the annual convention of the American Psychological Association, San Francisco, CA, August 16, 1998.

Gutierrez, P. M., & Hagstrom, A. H. Uses for the Multi-Attitude Suicide Tendency Scale. Presented at the American Association of Suicidology annual conference, Bethesda, MD, April 17, 1998.

Gutierrez, P., & Williams, J. Children's understanding of death. Presented at the Midwestern Psychological Association annual meeting, Chicago, IL, May, 3, 1991.

GRANTS:

10/12-9/15 Department of Veterans Affairs National Center for Patient Safety; Advisory Board member (PI Monica Matthieu, Ph.D., LCSW); **$569,222** for *Patient Safety Center of Inquiry for Suicide Prevention*.

7/12-7/15 Military Suicide Research Consortium; Principal Investigator; **$2,381,228** for *Toward a Gold Standard for Suicide Risk Assessment for Military Personnel.*

3/11-2/13 Department of Defense, Military Operational Medicine Research Program, grant; Consultant (PI Steven Vannoy, Ph.D., MPH); **$1,354,386** for *Development and Validation of a Theory Based Screening Process for Suicide Risk.*

3/11-3/15 Department of Defense, Military Operational Medicine Research Program, grant; Co-Investigator; **$3,400,000** for *A Randomized Clinical Trial of the Collaborative Assessment and Management of Suicidality vs. Enhanced Care as Usual for Suicidal Soldiers.*

9/10-9/15 Department of Defense, Military Operational Medicine Research Program, grant; Principal Investigator: jointly with Thomas Joiner, Ph.D., Florida State University; **$15,000,000 (additional $15,000,000 going to FSU)** for *Military Suicide Research Consortium.*

9/09-9/14 Department of Defense, Military Operational Medicine Research Program, grant; Principal Investigator; **$1,173,408** for *Blister Packaging Medication to Increase Treatment Adherence and Clinical Response: Impact on Suicide-related Morbidity and Mortality.*

5/09-5/10 Colorado TBI Trust Fund Education grant; **$8427** to support the hosting of a conference of national experts in suicide safety planning and TBI rehabilitation.

5/08-5/09 Colorado TBI Trust Fund Education grant; **$5,000** to support the hosting of a conference of national experts in assessment of TBI and suicide risk and the role of executive dysfunction in linking the two problems.

HONORS AND AWARDS:

2014 Roger J. Tierney Award for Service, American Association of Suicidology.

2005 Shneidman Award for Significant Contributions to Suicide Research, American Association of Suicidology

2003 Outstanding Young Alumni, Winona State University

PROFESSIONAL SERVICE:

6/14-8/14 Expert Adviser for the Royal Australian & New Zealand College of Psychiatrists Clinical Practice Guidelines Project on Deliberate Self-harm, Prof. Gregory Carter, Chair

1/12- Department of Psychiatry Faculty Promotions Committee

1/12- Editorial Board Member, *Archives of Suicide Research*, Barbara Stanley, Ph.D., Editor-in-Chief

4/09- Associate Editor, *Suicide and Life-Threatening Behavior*, Thomas Joiner, Ph.D., Editor-in-Chief.

4/09-4/11 Past-president, Board position, of the American Association of Suicidology.

3/09-12/09 U. S. Army Suicide Reduction and Prevention Research Strategic Planning Workgroup, Soldier Identification and Case Management Expert Lead.

5/07-10/08 Member of the International Advisory Board for the Australian National Study of Self Injury (ANESSI), Professor Graham Martin, Director.

4/07-4/09 President of the American Association of Suicidology.

3/06-3/07 Reviewer for National Registry of Evidence-based Programs and Practices, Substance Abuse and Mental Health Services Administration.

4/05-4/07 President-Elect of the American Association of Suicidology.

2/04-4/09 Consulting Editor and Editorial Board member, *Suicide and Life-Threatening Behavior*, Morton M. Silverman, M.D., Editor-in-Chief.

11/02-6/06 Member, Illinois Suicide Prevention Strategic Planning Task Force, Illinois Department of Public Health.

3/02-1/06 Member, American Association of Suicidology Institutional Review Board.

4/00-4/03 Director, Research Division, American Association of Suicidology.

4/99- Ad hoc reviewer for *Psychiatry Research; Journal of Personality Assessment; American Journal of Public Health; Internal Journal of Circumpolar Health; Death Studies; Social Problems; Journal of Adolescent Research; Child Abuse and Neglect; British Journal of Clinical Psychology; Journal of Clinical and Consulting Psychology; Journal of Abnormal Psychology; International Journal of Psychology; Archives of Suicide Research; American Journal of Orthopsychiatry; Journal of Mental Health Counseling; Crisis.*

1998-2002 Member, North Central Association Outcomes Endorsement Team for Auburn High School, Rockford, IL.

7/98-4/00	Chair, Publications Committee, American Association of Suicidology.
1998-2006	Director, Adolescent Risk Project, Auburn High School, Rockford, IL. Combined research and suicide risk screening project.
1997-2006	Faculty Associate of the Center for Latino and Latin-American Studies at Northern Illinois University.

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS:

2010-	International Academy for Suicide Research, Fellow
2007-	Colorado Psychological Association
2003-2010	International Academy for Suicide Research, Associate Member
1999-	APA Div. 12, Section VII, Clinical Emergencies and Crises
1998-2010	APA Div. 53, Society of Clinical Child and Adolescent Psychology
1997-2007	Midwestern Psychological Association
1996-	American Association of Suicidology

A2 Usability and Utility of a Virtual Hope Box for Reducing Suicidal Ideation
Nigel Bush, Ph.D.

Task 1: Finalize agreements and subcontracts with participating clinical site (Months 1-2)

- Final completion in Month 5.
    - The process for subcontract agreement with VA Portland was started in months 1 and 2 and finally executed on March 19, 2012.

Task 2: Hire and train Phase 1 (P1) study staff (Months 1-3)

- Completed on schedule.
    - The mobile application developer was hired in November 2011 and equipment for him was procured. Development and testing of the VHB app began December 2011.

Task 3: Develop and test VHB app. (Months 4-9).

- Completed on schedule.
    - Android and iPhone versions of the VHB were developed concurrently using an iterative process of "agile" modular designing, testing and modifying.
    - Heuristic usability testing of progressing prototypes, including graphics, layout and interface was completed by the T2 TEC lab on February 10.
    - Functionality usability testing by the TEC lab commenced on March 26 and was completed April 6 and the VHB was determined to be ready for Phase 2.

Task 4: Set up Phase 2 (P2) clinical site (Months 10-12).

- Completed on schedule.
    - Initial training for the clinical site staff was conducted April 24 by Dr. Bush in Portland.
    - Preliminary Portland VA IRB approval was obtained in April followed by MSRC and HRPO in July. Final minor modifications to the protocol, study materials and processes were made through a series of collaborative dialogs between T2 and Portland. Final Portland IRB approval process was close to complete as of 10/19/2012.
    - The Portland onsite study coordinator was hired July 30, 2012 and completed training at T2 August 31, 2012.
    - Training of participating clinic providers was completed by the coordinator November 1, 2012.
    - Portland VA clinic space was allocated for study participant recruitment and assessment in October 2012.
    - In preparation for recruitment, cell-phone signal hot-spot equipment was installed for study use October 2012.
    - Obtained approval from Portland IRB to add iPhone version of VHB to study and introduced the iPhone version of VHB as option to participants in October 2012.

Task 5: Hire and train Phase 2 study staff (Months 10-12)

- Completed on schedule

Task 6: Implementation of Phase 2 intervention and data collection (Months 10-18)

- Completed by month 24.
    - Recruitment for Phase 2 began November 2012.

- All participants have completed construction of their respective VHB or Physical Hope Box and are either actively field testing them or have completed the first phase of the study and moved on to constructing and testing the alternative hope box medium, as of March 2013.
- As of October 2013, enrollment is complete. The specified sample size was 10-25, 19 Veterans were recruited with 9 assigned to the VHB-PHB arm and 10 assigned to the PHB-VHB arm (virtual hope box or physical hope box cross-over design). One participant of the latter group withdrew, leaving 9 in each group.

Task 7: Data analysis and dissemination of results (Months 19-27)

- Completed by month 27.
  - Recruiting has ceased with a final sample of 18.

Task 8: VHB App Modification (Months 25-29)

- Complete in month 29.
  - VHB application updates based on initial user and provider feedback were implemented.
  - VHB application is starting its RCT and updates will be ongoing.

As of March 2013, the pilot grant for the Virtual Hope Box was completed.

Presentations

Bush N. & Dobscha S. (August 2014). Effectiveness of a Virtual Hope Box Smartphone App in Enhancing Veterans' Coping with Suicidal Ideation: A Randomized Controlled Trial. Military Health System Research Symposium (MHSRS) 2014. Ft. Lauderdale FL.

Bush N. & Stewart A. (September 2014). Integration of Mobile Health Technologies in Clinical Practice. Dept. of Defense Public Health Quad Service Collaboration. Webinar.

Bush N. & Wheeler W. (September 2014). The Virtual Hope Box. American Association of Suicidology, Suicide Prevention Social Media- Weekly Twitter Chats with Expert Guests.

Publications

Bush, N. E., Dobscha, S. K., Denneson, L. M., Hoffman, J. E., Crain, A., Crumpton, R., Cromer, R., & Kinn, J. T. (available online May 2014). A Virtual Hope Box Smartphone App as an Accessory to Therapy: Proof of Concept in a Clinical Sample of Veterans. *Suicide & Life-Threatening Behavior.*

A3 A Behavioral Sleep Intervention for Suicidal Behaviors in Military Veterans: A Randomized Controlled Study
Rebecca Bernert, Ph.D.

Task 1: Secure Approvals, Hire/Train Personnel, Prepare for Data Collection
Months 1-3: Complete

IRB/ R&D/ HRPO/ Sponsor Approvals: Complete

- IRB submission and approval for several modifications (Approved July 2015)

Data and Safety Monitoring Board Assembly and Clinical Trials Registry: Complete

- Finalized assembly and membership of DSMB
- Registered protocol at Clinicaltrials.gov
- Registered protocol at Stanford Clinical Trials Registry

Task 2: Hire/Train Personnel, Prepare for Data Collection, Initiate Recruitment and Screening/Randomize 76 Eligible Veterans
Months 3-21: Ongoing, request for No-Cost Extension Approved

Personnel/ Stanford/ PAIRE Hiring and WOC VAPAHCS Appointment Processing/ Badging: Complete

- Completed hiring search and institutionally-required job postings/ employment paperwork for project staff
- Founded research program (Suicide Prevention Research Laboratory) and initiated formal affiliation with Stanford Mood Disorders Centers
- Developed trainee apprenticeship program in affiliation with Stanford University, Palo Alto University (clinical psychology graduate programs PhD/PsyD), and VA Palo Alto HCS Volunteer Services to further expand lab and research assistant infrastructure to support project management; retained two PhD students as part of this 2-year program; initiated associated Stanford-related and WOC paperwork

Study Investigator Meetings/ Consultation Meetings: Ongoing

- Completed regularly-scheduled Consultation and Co-Investigator meetings

Equipment/ Infrastructure/ Protocol Development and SOP Manual Development: Complete

- Purchased and installed Presentation software at Lucas Center to enable ongoing data collection in fMRI scanning sub-arm.
- Completed training of Study Coordinator in execution of fMRI computer tasks to increase coverage and facilitate execution of fMRI scanning study.
- Completed training for salivary sampling sub-arm for J. Kim (Study Coordinator) and T. Dondero (Summer Medical Student Fellow) and continued development of salivary sampling protocol; Successfully completed launch of salivary sampling sub-arm.
- Worked with Stanford Financial Support Center staff to ensure that all participant compensation materials and procedures are in compliance with new, heightened Stanford patient confidentiality standards.
- Worked with Stanford IT staff to ensure that all laboratory computers are in compliance with new, heightened Stanford security standards (encryption, back-up, and phase-out of non-compliant computers).
- Worked with Stanford IT staff to repair study computer and service laboratory telephone lines.
- Worked with Stanford administrative staff to obtain study space for participant computer use, ratings, and treatment sessions, amid Departmental and SOM space restructuring.

- Continued revisions/standardization to lab manual, SOP manual, study materials, and training manuals.
- Continued development of fMRI scanning protocol.

Recruitment and Screening: Ongoing

- Recruitment efforts include a comprehensive recruitment plan developed in partnership with military installations and outreach services within VA programs, clinic presentations, chart reviews and direct mailings, and participation in military-specific events.
- Initiated recontacts for notifying inclusion criteria change through phone and email, and conducted rescreen assessments over phone
- Conducting subject recruitment and screening
- Conducting Baseline, Treatment Weeks 1-4, and Follow-up visits eligible warriors.
- Invitation of participants for additional treatment following study unblinding at follow-up.
- Conducting quality control checks of clinical data. Monitored safety, adverse events for DSMB reporting.
- To date, recruitment activities have generated N=586 new contacts expressing interest in the study.
- Of these, N=305 individuals have been screened, of whom N=95 met initial inclusion criteria (N=6 met criteria for delayed eligibility visit due to delay criteria) for eligibility assessment; N=52 completed eligibility visits.
- Of N=52 eligibility assessment visits completed, N=37 were deemed eligible and enrolled in the study, and subsequently successfully randomized to treatment.
- To date, N=33 participants have completed treatment and are now in follow-up study phases; N=2 participants withdrew prior to receiving treatment due to personal scheduling constraints.
- Continued to conduct quality control checks of clinical data; monitor safety and adverse events for DSMB reporting.

Initiated Database Development & Data Entry

- Maintained study databases to support data entry and quality control data verification checks.
- (Continued) Conducted quality control checks of clinical data; trained lab trainees to monitor, input, and cross-check data using standardized procedures under supervision of lab manager and study PI.
- Completed training of additional lab personnel to facilitate double-scoring, double-entry protocol; instituted new quality controls to alert PI to any deviations to database entry/verification/management.

Task 3: Complete Follow-Up Testing, Conduct Data Analyses, Prepare for Publications
Months 21-24: Request for No-Cost Extension Approved

Results and Significance

- Successful coordination and execution of N=37 participants enrolled (of which, N=33 have completed treatment; 6 groups and 16 individuals) serves as a feasibility proof of concept.
- Formal data analyses have not been conducted for primary analyses; database development and data entry are actively underway, with verification of data ongoing. Preliminary subanalyses have been conducted, and are reported in Presentations/Abstracts.

A4 Suicide Bereavement in Military and their Families
Julie Cerel, Ph.D.

Task 1. Protocols submitted to and approved by IRB – Completed
The project was approved by the University of Kentucky IRB and HRPO.

Task 2. Obtain sample for random digit-dial survey – Completed
The Suicide Bereavement in Military and their Families research team obtained a sample for random-digit dial survey via landline and cell phone.

Task 3. Engagement with local/national organizations to obtain sample of family members – Completed
The Suicide Bereavement team engaged with organizations to be able to help recruit family members.

Task 4. Family interviews – Completed
The research team completed 24 family interviews.

Task 5. Veteran and community members invited to complete online surveys – Completed
The team revised the methodology so that they get phone numbers at phase 1 and schedule people directly for phase 3 interviews. Participants can later return and complete the online measures for phase 2.
105 phase 2 online surveys completed.

Task 6. Interview of suicide and traumatic-death exposed veterans and suicide-exposed community members – Completed
105 phase 3 interviews have been completed.

Task 7. Transcription of interviews and data analysis – Completed
105 interviews transcribed.
Preliminary data analysis completed and data analyses for secondary and exploratory hypotheses underway.

Presentations

Cerel, J., Maple, M., van de Venne, J., Moore, M. (April 2014). Relationships Matter: Examining the Role of Relationships on Closeness and Impact of Suicide Exposure. Poster presentation at the American Association of Suicidology 47th Annual Conference, Los Angeles, CA.

Moore, M., van de Venne, J., Cerel, J. The fruits of trauma? (April 2014). Posttraumatic growth in suicide exposed military veterans and community members. Poster presentation at the American Association of Suicidology 47th Annual Conference, Los Angeles, CA.

Publications

White papers submitted and disseminated:

1. Cerel, J., & Castro, C. (June 27, 2014). Promoting Resilience Following Suicide Exposure in Military Populations. https://msrc.fsu.edu/sites/msrc.fsu.edu/files//Military%2520Suicide%2520Exposure.pdf

Completed transcription and quantitative and qualitative analysis:

1. Cerel, J., van de Venne, J., Moore, M., Maple, M., Flaherty, C., Brown, M.M. (2015) Veteran Exposure to Suicide: Prevalence and Correlates. *Journal of Affective Disorders, 179 (2015) 82-87.*

Manuscripts in preparation:

1. Cerel, J., Maple, M. van de Venne, J. & Moore, M. & Flaherty, C. (in preparation) Relationships matter: Examining the role of relationships on closeness and impact of suicide exposure
2. Moore, M., van de Venne, J., Maple, M. & Cerel, J. (in preparation). Posttraumatic growth in suicide exposed military veterans and community members
3. Soberay, K., Cerel, J., van de Venne J., Moore, M., & Maple, M. (in preparation) Exposure to suicide versus traumatic deaths explored within an interpersonal theory. *Crisis.*

A5 Window to Hope: Evaluating a Psychological Treatment for Hopelessness among Veterans with TBI: A Phase II RCT and an Active Control Component
Lisa A. Brenner, Ph.D., ABPP

PHASE I: Study Initiation/Cross-cultural Adaptation/Feasibility/Acceptability & Conduct WtoH Pilot

Task 1: Build infrastructure; begin adapting WtoH for a Veteran population; hire and train personnel; create database/measures; expert consensus meeting; revise intervention; obtain regulatory approval

- Staff hired and trained, database created (Q1: **Complete**)
- Initial cross-cultural adaptation procedures completed (Q1-Q2: **Complete**)
- Regulatory approval to conduct human subjects research obtained (Q1-Q2: **Complete**)

Task 2: Train treatment providers on WtoH; recruit for WtoH pilot phase; conduct pilot group, analyze pilot data, and adapt WtoH treatment

- Pilot groups completed; data analyzed (Q1-Q2: **Complete**)
- WtoH further adapted according to feedback and ready for RCT(Q1-Q2: **Complete**)

PHASE II: RCT

Task 3: Recruit and consent participants for RCT; collect and enter Time 1 data

- 90 recruited to complete study procedures; Time 1 data collected and entered (Q2-Q12: **Complete**)

  Progress: RCT screening and recruitment procedures are complete with 44 participants randomized. Database architecture is complete, time 1 data has been entered.

Task 4: Conduct Phase II RCT WtoH intervention and complete Time 2 data collection

- RCT WtoH intervention complete; Time 2 data collected for all participants; Time 2 data entered in database (Q2-Q12: **Complete**)

  Progress: WtoH intervention is complete. Database architecture is complete, and all time 2 follow-up data has been entered.

Task 5: Complete Time 3 data collection

- Time 3 data collected and entered in database; all data checked for accuracy (Q2-Q12: **Complete**)

  Progress: Time 3 data collected and entered in database; all data checked for accuracy.

Task 6: Evaluate treatment adherence

- FRS scores generated and feedback provided to clinicians (Q2-Q12: **Complete**)

  Progress: All 3 WtoH study clinicians have passed the FRS checks for their initial RCT groups, and feedback has been provided to each clinician.

Task 7: Analyze quantitative and qualitative data

- Data analyzed and results interpreted (Q7-Q12: **In Progress**)

  Progress: WtoH Pilot group acceptability and feasibility data has been analyzed and interpreted. RCT data analysis is pending due to data entry and data integrity checks.

Task 8: Disseminate findings

- Findings disseminated through: presentations at scientific conferences; submission of manuscripts for publication; study information posted on MIRECC website (Q2-Q12: **In Progress**)

  Progress: Cross-cultural adaptation, pilot results, and RCT progress have been presented at multiple scientific conferences, a manuscript on the cross-cultural adaptation and pilot results is in progress, and study information has been posted on MIRECC and MSRC websites.

Task 9: Submit final research progress and fiscal reports

- Final reports successfully submitted (Q7-Q8: **Pending**)

  Progress: Final reports are pending due to ongoing study procedures. The final report is due October 26, 2015.

PST-SP PILOT

Task 1: Train study therapists in the delivery of problem solving therapy for suicide prevention

- Study therapists read relevant literature and available treatment manuals; attend supervised training with experienced PST providers. (Q3-Q5: **Complete**)

Task 2: Adapt PST treatment manual for acceptability and feasibility among veteran population

- Revise existing PST treatment manual to focus on suicide prevention in a Veteran/Military population with a history of traumatic brain injury. (Q4-Q5: **Complete**)

  Progress: The PST manual has been developed through a collaborative process among the research team and the PST trainers.

Task 3: Enroll 24 participants across 8 groups

- 24 participants recruited and Time 1, 2, 3 assessments completed along with attendance data. (Q7-Q12: **Complete**)

  Progress: PST-SP for TBI pilot recruitment has ended with 13 participants consented. Time 1 and 2 assessments completed along with attendance data.

Publications, Presentation and Other Deliverables:

Brenner LA. Exploring the link between suicide and TBI, Interview with Voelker R of the APA Monitor Vol 43, No. 11, 2012 Dec.

Brenner LA. Mental Health Needs of those with TBI. *5th Annual Conference Brain Injury Association of Kansas: Beyond Rehab: Succeeding at Life*. 2013 Mar 7-8; Kansas City, Kansas.

Brenner LA. Rehabilitation Psychology and Suicide Prevention: Evidence-Based Assessment and Treatment Strategies. *15th Annual Conference Rehabilitation Psychology: Expanding the Boundaries of Rehabilitation Psychology*. 2013 Feb 21-24; Jacksonville, Florida.

Brenner LA. White Paper Response at Request of COL Castro (MOMRP/DOD), on Window to Hope: Evaluating a Psychological Treatment for Hopelessness among Veterans with TBI. 2011 Dec 15.

Brenner LA, Simpson GK, Matarazzo BB, Signoracci GM, Forster JE, Clemans TA, Hoffberg AS. Cross-Cultural Adaption, Feasibility, and Acceptability of the Window to Hope Program among US Veterans with Traumatic Brain Injury (TBI): A Pilot Study. *1st International Academy for Suicide Research, World Congress on Suicide: From Research to Practice*. 2013 Jun 10-13; Montreal, Quebec.

Brenner LA, Simpson GK, Matarazzo BB, Signoracci GM, Clemans TA, Forster JE, Hoffberg AS. Cross-Cultural Adaption, Feasibility, and Acceptability of the Window to Hope Program among US Veterans with Traumatic Brain Injury (TBI). *10th World Congress on Brain Injury*. 2014 Mar 19-22; San Francisco, CA.

Brenner LA, Simpson GK, Matarazzo BB, Signoracci GM, Forster JE, Clemans TA, Hoffberg AS. Window to Hope: Evaluating a Psychological Treatment for Hopelessness among Veterans with Traumatic Brain Injury. *46th Annual Conference American Association of Suicidology: Challenging our Assumptions and Moving Forward Together*. 2013 Apr 24-27; Austin, Texas.

Brenner LA, Simpson GK, Matarazzo BB, Signoracci GM, Forster JE, Clemans TA, Hoffberg AS. Window to Hope: A Psychological Treatment for Hopelessness among Veterans with TBI. *121st Annual Convention American Psychological Association*. 2013 Jul 31 – Aug 4; Honolulu, Hawaii.

Matarazzo BB, Hoffberg AS, Clemans TC, Signoracci GM, Simpson GK, Brenner LA (Sep 2014). Cross-cultural adaptation of the Window to Hope: A psychological intervention to reduce hopelessness among US Veterans with traumatic brain injury. *Brain Inj*; 28(10): 1238-1247. DOI: 10.3109/02699052.2014.916419

MIRECC Webpage redesigned and featured page created with educational information on the Window to Hope research study. Dec13.

Signoracci GM, Brenner LA, Simpson GK, Matarazzo BB, Forster JE, Clemans TA, Hoffberg AS. Window to Hope: Evaluating a Psychological Treatment for Hopelessness among Veterans with Traumatic Brain Injury. *DoD/VA Suicide Prevention Summit: Innovative Practices in Research*. 2013 Dec 13; Washington, DC.

Simpson GK, Brenner LA, Matarazzo BB, Signoracci GM, Harwood J, Clemans TA, Hoffberg AS. Testing the fidelity and acceptability of the Window to Hope program among US veterans with traumatic brain injury: A pilot study. *7th Annual Research and Teaching Showcase, Ingham Institute for Applied Medical Research*. 2012 Nov 30; Liverpool Hospital, Australia.

Simpson GK, Brenner LA, Matarazzo BB, Signoracci GM, Harwood J, Clemans TA, Hoffberg AS. Testing the fidelity and acceptability of the Window to Hope program among US veterans with traumatic brain injury: A pilot study. *7th International Conference on Social Work in Health and Mental Health: Pathways to Client-Centred Care.* 2013 Jun 23-27; Los Angeles, California.

A6 Suicide Risk Assessments within Suicide-Specific Group Therapy Treatment for Veterans: A Pilot Study

Lori Johnson, Ph.D. & David Jobes, Ph.D.

Task 1: Hire and train study staff. (Year 1 Months 1-10)

1a: RRVAMC PI and CO-I, recruit, select, and hire study staff – **Complete**

1b: RRVAMC PI and Co-I ensure all study staff complete VAMC human subjects and IRB trainings – **Complete**

1c: CUA and UW Co-Is train all RRVAMC staff in study policies and procedure and administering study assessments - **Complete**

1d: RRVAMC staff begins recruitment and initial assessment procedures for pilot cases. Staff consults with CUA and UW Co-Is and Denver VA MIRECC consultant concerning effectiveness of recruitment procedures and initial assessment. Research team develops adaptations as needed prior to test cases – **Complete**

1e: Experimental and control groups begin pilot cases. Team consults with Co-Is for effectiveness of procedures and adaptations as needed prior to test cases – **Complete**

Task 2: Data Collection. (Year 1 Month 10 – Year 3 Month 10)

2a: RRVAMC staff recruits study participants and assures fast and efficient randomization to study conditions **– Complete**

2b: Groups run **– Complete, enrolled 141 Participants before closing enrollment**

2c: RRVAMC staff members complete group entry assessment and follow-up assessments at 1 month, and 3 months – **Complete**

2d: CUA and UW Co-Is provide feedback and supervision to RRVAMC group co-leaders **- Complete**

2f: Denver VA MIRECC consultant provides consultation on difficult cases, study issues, and data collection and management as issues arise. **– Complete**

2g: In accordance with Military Suicide Research Consortium (MSRC) standard operating procedure, the PI and UW Co-I establish final database systems and data entry and cleansing procedures appropriate to data collected. All data will be collected by RRVAMC staff in accordance with the highest of HIPAA, VA, and MSRC standards. All data will be entered and maintained according to the strictest of HIPAA, VA, and MSRC standards. Data entry and management occurs on an ongoing basis. **- In Progress**

Task 3: Hiring and training of replacement staff, if needed.

3a: PI provides study training to any replacement staff, to assure sufficient flow through clinical trial (any time between Year 1 Month 3 and Year 2 Month as needed). –**Complete**

Task 4: Data analysis and dissemination of results. (Year 3 Months 9-12)

4a: Data analysis **- In Progress**

4b: Presentations, reports, and publications reflecting analyses will be prepared **- In Progress.**

4c: Manual Development **– In Progress**

Other Progress:

Villate, J., O'Connor, S., Gutierrez, P., Leitner, B., Kerbrat., A., Johnson, L. (2015, October). Differences in Risk Factors and Characteristics of Suicide Attempts between Active Duty

Military Personnel and Veterans. Symposium scheduled to be presented by Villate, J. at the 2015 IASR/AFSP International Summit on Suicide Research. New York City, NY.

Johnson, L., O'Connor, S.S., Jobes, D.A., Hagman, S., Jennings, K. W., (2015, June). Group Therapy for Veterans Struggling with Suicidality. Workshop to be presented at the 2015 Aeschi 8 Conference: Bearing the Struggle: Exploring the Challenges Facing Clinicians Working with Suicidal Patients. Vail, CO.

Carney, E., O'Connor, S.S., Johnson, L., Jobes, D.A., & Kaminer, B. (2015, April). Comparative impact of group cohesion and length of treatment for veterans enrolled in a suicide-focused group therapy. Poster presentation at the 2015 American Association of Suicidology conference, Atlanta, GA.

Groh, B., O'Connor, S.S., Johnson, L., Jobes, D.A., & Kaminer, B. (2015, April). Impact of working alliance on clinical outcomes in veterans enrolled in a suicide-focused group therapy. Poster presentation at the 2015 American Association of Suicidology conference, Atlanta, GA.

Thieman, R., Soto-Freita, A., O'Connor, S.S., Johnson, L., Jobes, D.A., & Kaminer, B. (2015, April). The impact of interpersonal abuse on Veterans enrolled in a suicide-focused group therapy. Poster presentation at the 2015 American Association of Suicidology conference, Atlanta, GA.

A7 Toward a Gold Standard for Suicide Risk Assessment for Military Personnel
Peter M. Gutierrez, Ph.D. & Thomas Joiner, Ph.D.

Task 1. Hire and train staff (timeframe, months 1-4):

1a. Hire and train project coordinators at MIRECC and FSU (timeframe, months 1-2) - Complete

Project Coordinators for both sites were hired and trained on study procedures.

1b. Hire and train site assessors (timeframe, months 3-4) - Complete

Five full-time site assessors and one part-time site assessor have been fully trained on study procedures.

Task 2. Begin and complete baseline data collection; start longitudinal tracking (timeframe, months 4-24):

2a. Begin baseline data collection (timeframe, month 4) **– Complete**

2b. Continue and complete baseline data collection (timeframe, months 4-24). - **In Progress**

2c. Begin longitudinal tracking (timeframe, months 4-27). - **In Progress**

Recruitment totals:

TOTAL	**Enrolled**	**Follow-ups Completed**
Total	544	256

Other Progress

A collaboration has been agreed upon between the Israel Defense Forces Suicide Prevention Team and the Gold Standard study team. Dr. Leah Shelef is an IDF psychologist currently running a study using the C-SSRS and BSS. Dr. Shelef has added the SHBQ and SBQ-R to their assessment study protocol. This will allow data to be combined from the two studies to look at the predictive validity of the measures cross-nationally. Scoring has been agreed upon and data collection has begun.

A8 Psychophysiology of Suicidal States: Temperamental and Physiologic Suicide Risk Assessment Measures and Their Relation to Self-Reported Ideation and Subsequent Behavior

Michael Allen, M.D. & Theresa Hernàndez, Ph.D.

Task 1: Regulatory Review/Approval –Complete

Received COMIRB and VA approval. HRPO final approval received July 8, 2013.

Task 2: Study Coordinator Hiring and Training – Complete

All administrative tasks on hiring and training were completed.

Task 3: Purchase and train on Equipment – Complete

The purchasing of equipment and training of study coordinator completed.

Task 4: Recruit, consent, and enroll participants, and complete data acquisition through the 6-week follow-up.

Participant recruitment initiated; enrollment into study after consent and ongoing data acquisition through 6-week follow-up.

This study closed as of 10/01/2013: The one participant who was enrolled was notified of closure of the study, and no further contact will be initiated.

A9 Neuroimaging Correlates of Suicide

Deborah Yurgelun-Todd, Ph.D. & Perry Renshaw, MD, Ph.D., MBA

Phase 1: Submission/Planning Phase (months 0-1) - **Complete**

Task 1: Submission of an amendment to our previously approved neuroimaging study entitled Neurobiology of Suicide Risk in Traumatic Brain Injury and Substance Abuse.

Phase II: Recruitment, Clinical Assessments, Neuroimaging and Data Collection (months 1-21). – **In Progress**

Task 1: Subject Recruitment (months 1-21).

We will recruit 80 Veterans with and without a history of SDV. The study coordinator will develop and prepare recruitment materials including duplication and distribution of materials to selected target audiences.

- We have created a study database and entered demographic data and MSRC common elements data for 63 subjects.
- Table 1 summarizes basic demographic and service information.

Age (mean years)	37.14
Age (range)	20-54
Gender	48 m, 15 f
Air Force	7
Air Force Reserves	5
Air Force National Guard	2
Army	17
Army Reserves	12
Army National Guard	11
Coast Guard	1
Coast Guard Reserves	0
Marines	10
Marine Reserves	1
Navy	15
Navy Reserves	0
Number with service connection	24
GAF (mean)	76.24

Task 2: Clinical Assessment and Neuroimaging (months 1-21). – **In Progress**

All participants will receive extensive diagnostic and clinical assessments, neuropsychological evaluation neuroimaging.

- We have reviewed scoring for the neuropsychological measures and these assessments are currently being scored. All imaging data has been downloaded and anonymized. Back up files for the imaging data have also been created.

Task 3: Data Collection and Storage (months 1-21). – **In Progress**
The study coordinator will ensure all study forms, clinical and neuroimaging data is received in correct form and safely stored.

Phase III. Data Analysis and Reporting (months 1-26). – **In Progress**

Task 1: Analysis of neuroimaging data (1-26 months). An integrity check of the imaging data will be performed during the first 4 months of the proposed project. Processing of the imaging data will begin as soon as the data is collected with more complex imaging analyses occurring in months 9-26. – **In Progress**

Task 2: Analysis of clinical data (months 5-26). Statistical analysis of the clinical data will be performed beginning in the 5th month of study and be completed by the 26th month of the study. – **In Progress**

Task 3: Presentations and publications (months 9-26). Team members will present preliminary data at conferences and finalize and publish manuscripts of the results by the end of the 26th month. – **In Progress**

During the preparation for the annual meeting it was noted that suicide attempters were notably different than suicide ideators. Therefore, we have decided to focus data collection for remaining subjects only on suicide attempters. For this quarter, additional data scoring and entry were completed and a blinded, thorough review of all diagnostic criteria for each subject was initiated. Preliminary analyses of neuropsychological data as they related to pain components was completed and submitted for publication in *Psychological Services*. This work is summarized below.

Pain Catastrophizing, Perceived Pain Disability, and Pain Descriptors in Veterans: The Association with Neuropsychological Performance Margaret Legarreta, Elliott Bueler, Jennifer DiMuzzio, Erin McGlade, and Deborah Yurgelun-Todd, under review

Pain catastrophizing, pain disability, and sensory, affective, and evaluative descriptors of pain were examined in light of neuropsychological test performance in an attempt to understand the relationship between chronic pain and altered cognitive function. Cognitive complaints among individuals with chronic pain are common. While estimates range substantially by study, population, and pain type, overall research findings consistently cite an association between chronic pain and diminished cognitive function. One investigation of individuals with general musculoskeletal pain and chronic fatigue identified at least one cognitive complaint in 85-90% of the participants. In another study of adults seeking pain treatment at a university based medical center, 42% reported at least one cognitive concern. Furthermore, several investigations have examined the performance on objective measures of neuropsychological performance and found an association between pain and impaired performance. We examined whether individuals with greater endorsement of negative pain descriptors, pain catastrophizing, and perceived

pain disability would show greater reduction in new learning and memory recall

Participants included fifty Veterans recruited from a local VA hospital, as well as from the community via flyers and word of mouth, were enrolled in this study. Of the Veterans recruited, 38 (76%) met criteria for the presence of chronic pain and were included in the analysis. All veterans completed the SCID-IV, clinician-rated symptom measures (HAM-A, HAM-D), a neuropsychological battery (COWA-FAS, Stroop, TMT, Ruff 2 & 7, and CVLT-II) Pain was measured with the McGill Pain Questionnaire, the Pain Disability Index, and the Pain Catastrophizing Scale.

Findings revealed that learning and memory were associated with both pain catastrophizing and perceived pain disability, but not affective or evaluative descriptions of pain. Executive function and attention were not related to any of the pain characteristics examined in this study. Of important note, neuropsychological performance was not influenced by mental health functioning in this Veteran sample.

Findings from this study suggest that catastrophizing as well as perceived disability may have an impact on the cognitive functioning in individuals with chronic pain. Moreover these pain dimensions are specifically related to learning and memory. This study expands upon the current body of knowledge regarding neurocognitive performance by patients with chronic pain, as middle-aged Veterans are a population that has thus far not been examined. Further, this study attempted to clarify cognitive mechanisms that may impact the relationship of chronic pain and neurocognitive performance. Identification of potential mechanisms that affect the relationship between neurocognitive performance and chronic pain may contribute to the development of new treatment targets to both decrease the intensity of pain felt as well as reduce the cognitive deficits found among many chronic pain patients. Given the relationship between pain and suicide, these findings are likely to inform the treatment of pain and comorbid suicidal ideation and behaviors.

Task 4: Application for further funding (months 21-26): Applications for further funding will occur during the last 6 months.

A10 A Novel Approach to Identifying Behavioral and Neural Markers of Active Suicidal Ideation: Effects of Cognitive and Emotional Stress on Working Memory in OEF/OIF/OND Veterans

Melissa Amick, Ph.D. & Beeta Homaifar, Ph.D.

Objective 1: Create infrastructure for study implementation and execution – **Complete**

Task 1: Build infrastructure, obtain regulatory approval for both sites, hire and train personnel, acquire measures, create database (Quarter 1-2)

- All staff has been identified, hired, and fully trained on the research protocols.
- All measures have been obtained and are in use.

Objective 2: Conduct study –**In Progress**

Task 2: Recruit and consent participants (Quarters 3-6)

- Recruitment efforts are active and ongoing according to the recruitment plan.
- Data collection has begun, with complete data obtained on all measures for 32 participants.
- The primary outcome measure was developed, programmed, piloted, and has successfully obtained data for incoming participants.
- The database was completed and is in place as data entry continues with participant enrollment. All data has been entered to n=32.

Task 3: Execute post neuroimaging processing

- Initial analyses have begun on the functional and structural neuroimaging data, including image preprocessing and script development.

Recruitment and Enrollment Numbers:

Screened through TRACTS dataset: 460
Screened in CPRS Medical Records (Brockton inpatient unit and physician referrals): 660
Total screened: 1120
Attempted contact by phone: 77
Successful phone contact and screening: 58
Screened in person after TRACTS visit: 10
Enrolled: 32

A11 Home-Based Mental Health Evaluation (HOME) to Assist Suicidal Veterans with the Transition from Inpatient to Outpatient Settings: A Multi-site Interventional Trial

Bridget Matarazzo, Psy.D.

Specific Aim 1: Prepare HOME for Project Interventional Trial - **Complete**

Task 1: Build infrastructure for project - **Complete**

- Full regulatory approval has been obtained at all sites. The study is currently progressing according to the Statement of Work.

Specific Aim 2: Conduct HOME Project Interventional Trial –**In Progress**

Task 2: Recruit and consent participants for interventional trial; collect and enter Time 1 data

Task 3: Conduct HOME intervention at active sites and complete Time 2 data collection

Task 4: Complete Time 3 data collection

Task 5: Complete Time 4 data collection

The HOME trial is recruiting at all sites, delivering the HOME intervention at active sites, and collecting and entering data from all assessment times for all sites. To facilitate partnerships, continued recruitment and data collection, members of the study team continue to attend meetings on their site's inpatient units. All study staff continue to engage in recurring calls between all sites to ensure accuracy and consistency of study procedures.

Recruitment numbers are as follows:

	Total N	%	Denver	Philadelphia	Houston	Portland
Screens completed	5013	-	640	1307	1931	1135
Screened out	4666	93.1%	528	1249	1835	1054
Screened in	351	7.0%	112	58	100	81
Declined	122	34.8%	36	13	46	27
Enrolled	208	59.3%	71	39	48	50
Withdrew	14	6.7%	5	3	3	3
Completed study	55	26.4%	22	7	12	14

Presentations:

Meeting Suicidal Veterans and Military Personnel on Their Turf: The Home-Based Mental Health Evaluation (HOME) Program (Poster). December 2014. *Special Operations Medical Association (SOMA).* Tampa, FL.

A12 Effectiveness of a Virtual Hope Box Smartphone App in Enhancing Veteran's Coping with Suicidal Ideation: A Randomized Clinical Trial

Nigel Bush, Ph.D.

Task 1: Finalize agreements and subcontracts with participating clinical site (Months 1) - Complete

1a: Finalize agreement with VAMC-Portland clinical test site and its leadership for this project;

1b: Finalize subcontracts with this site.

Task 2: Hire and train T2 and Portland study staff (Months 1-3) - Complete

2a: Hire T2 software engineer;

2b: Hire site research coordinator.

2c: Site project manager and site clinical coordinator.

2d: train new site research coordinator in human subjects and other research protections, study policies and procedures, app specifications, and patient participant recruitment and testing procedures;

Task 3: Refine Pilot VHB-β into Production VHB 1.0 and test. (Months 1-12) – Complete

3a: Software engineer translates updated specs derived from pilot testing of VHB-β into production VHB 1.0 app;

3b: Study staff recruits participants from active service member population to test the production VHB 1.0 app for usability;

3c: If necessary, software engineer modifies VHB 1.0 app further based on usability testing feedback from participants**;**

3d: Software engineer provides initial technical support to clinical site for first year.

Task 4: Set up Portland clinical site (Months 1-4) - Complete

4a: Co-PI, T2 Research Coordinator **(**RC), site-PI, local behavioral health staff/clinicians, and relevant site operations staff meet at VA-based clinical test site introduce the study, and finalize procedures;

4b: VA site obtains approval from site IRB.

Task 5: Implementation of clinical site intervention and data collection (Months 5-18) – Complete

5a: Site research and clinical coordinators work with behavioral health staff/clinicians to recruit patient participants;

- Recruitment at the Portland VA is complete with 118 subjects enrolled resulting in a final sample of 106.

5b: participants randomized to two arms comparing VHB with enhanced treatment as usual (ETAU);

5c: intervention participants work iteratively over course of therapy with clinicians to develop personal VHB;

5d: participants use VHB or enhanced TAU offsite;

5e: outcome measures collected.

Publications, Presentations, and Media Requests:

- Bush NE, Dobscha SK, Crumpton R, et al. A Virtual Hope Box Smartphone App as an Accessory to Therapy: Proof-of-Concept in a Clinical Sample of Veterans. Suicide & Life-Threatening Behavior, 45, 1, 2015. DOI: 10.1111/sltb.12103
- Bush NE, Dobscha SK. Effectiveness of the Virtual Hope Box smartphone application for emotion regulation and stress reduction: Preliminary results from a randomized controlled clinical trial of veterans with suicidal ideation. 2015 Military Health Systems Research Symposium, August 17-21, 2015, Fort Lauderdale, FL.
- Denneson LM, Dobscha SK, Bush NE. Design and early findings from a randomized controlled trial of a smartphone application for veterans with suicidal ideation. American Association of Suicidology Annual Meeting. Atlanta GA, April 16, 2015.
- Bush NE, Dobscha SK. A Virtual Hope Box Smartphone App: Proof of Concept in a Clinical Sample of Veterans. "2015 VA/DoD Suicide Prevention Conference- One Connection, One Conversation, One Small Act-It Matters" January 27-30, 2015, Dallas TX.
- Dobscha, S.K. Preliminary Results from a Randomized Controlled Trial of a Smartphone Application for Veterans with Suicidal Ideation. National VA Cyberseminar, (pending) October, 13, 2015.
- 10/2/2015: Health.Mil Q&A with Dr. Nigel Bush on Virtual Hope Box, his team's 2014 MHS Innovation Award-winning mobile app: http://health.mil/News/Articles/2015/10/02/Bright-spots-of-innovation-QA-with-past-Innovation-Award-winner-Nigel-Bush
- 9-24-2015: Interview with Dr. Nigel Bush on Virtual Hope Box by Irish Times national newspaper.
- 9-11-2015: Virtual Hope Box puts suicide prevention tools at users' fingertips. Health.mil review of presentation on Virtual Hope Box by Dr. Nigel Bush

A13 Warning Signs for Suicide Attempts
Courtney Bagge, Ph.D. & Ken Conner, Psy.D., MPH

Task 1. Hire and train staff (timeframe, months 0-3): -**Complete**

1a. Hire and train project coordinators/assessors (timeframe, months 0-3).

Task 2. Creation of an interviewer-administrated computerized follow-back interview - Complete

2a. Hire programmer and create interview (timeframe, months 0-1.5).

2b. Test and finalize interview (timeframe, months 1.5-2.5).

- Administering Self-Report Data and Common Data Elements: Three additional personnel were added to the project to aid in administering the self-report battery. All site interviewers have practiced the self-report packet and script for administering this battery. These practice sessions continued until the individual interviewer started data collection.
- Facilitating data accuracy: Double entry was completed by individuals at all sites, and UMMC personnel ran data comparison reports to check for accuracy. Feedback for sites was compiled by UMMC and provided to trainers of other sites.
- Practiving the TLFB interviews (role plays) with UMMC staff: For the past three months, all sites attended weekly virtual meetings with UMMC staff and practiced giving the TLFB interview
- Engage in Meta-Supervision Feedback on Practice TLFB Interviews with UMMC staff: For the past three months, all site interviewers received meta-supervision feedback via telephone and email after each practice TLFB interview. All trainees are signed-off to initial fidelity standards and can complete the TLFB with participants.
- Adverse Event Decision Making Tool: CoE developed a Significant Adverse Event decision making tool this quarter, disseminated this to sites, and provided training during monthly calls on identifying and reporting adverse events. This tool has streamlined and clarified the process for reporting adverse events to CoE, MSRC, and HRPO.
- VAMC Treatment History Data Collection from Medical Records: An electronic data collection tool was developed and pilot tested with sites this quarter for use in collecting the study wide, current admission medical records data. All VAMC sites have received training on collecting medical chart and treatment history data.
- Study Wide Current Admission Medical Chart: A "Guide for Chart Abstraction" was developed by the CoE Coordinator with input from Dr. Conner and UMMC staff, during Q4. Effort was extended to further train staff in use of an electronic version of the study wide/current admission chart abstraction tool. VA sites are getting started with data collection and at this time have not yet received medical records data from the VA sites.

Task 3. Begin and complete data collection (timeframe, months 3-22): - **In Progress**

3a. Complete data collection (timeframe, month 3-22).

3b. Complete fidelity checks of data (timeframe, months 3-22).

Recruitment

- Time in the Field (from kickoff meeting [final approvals met] to quarter end [or site closure if earlier than quarter end date])
    - UMMC**:** 471 days
    - Rochester: 282 days
    - Seattle: 390 days
    - San Diego: 419 days
    - Arkansas: 218 days

- Enrollment
    - As of 9/21/15, 251 participants have fully completed all assessments. Below are the recruitment statistics for the study (Note: UMMC will take over Rochester's remaining recruitment of n=74 during the NCE period)

	Days in Field	**Total Eligible after Screening**		**Consented**		**Fully Completed**		**NCE Fully Completed**	**Total Fully Completed**
UMMC	471	157	84.4%	137	87.3%	125	91.2%	74	199
Rochester (recruitment ended on 4/30)	282	83	85.6%	58	69.9%	51	87.9%	n/a	51
Seattle (VA)	390	40	87.8%	37	92.5%	33	89.2%	37	70
San Diego (VA)	419	35	94.6%	35	100.0%	29	82.9%	n/a	29
Little Rock (VA)- (recruitment ended on 4/24)	218	20	90.9%	15	75.0%	13	86.7%	n/a	13
Total						251		111	362

Fidelity of Interviews of Participants and Consultation with UMMC Regarding Study Procedures:

- All trainees have consulted with UMMC staff via telephone and email regarding eligibility status and questions regarding participant tracking and study procedures.

- Each TLFB interview and audio is currently being reviewed by the UMMC Project Coordinator and discussed with Dr. Schumacher (who reviews two per week) to ascertain fidelity ratings.
- Trainees routinely meet virtually with the UMMC Project Coordinator to review their fidelity ratings on the TLFB with real participants and to receive meta-supervision in order to troubleshoot strategies to help facilitate interviews with difficult participants.

Meetings Between Sites and Recruitment and Data Tracking:
A standing monthly meeting occurred with at least one (usually two representatives from each site). The monthly numbers have so far been reviewed during study wide monthly meetings and recorded by the CoE coordinator in the minutes of these meetings. Minutes of these meetings are distributed to all sites. The UMMC coordinators, CoE coordinator, and Co-PIs also conduct ad hoc meetings by phone and address questions from sites by email on a frequent basis.

The Modal Suicide Decedent Did Not Consume Alcohol Just Prior to the Time of Death: An Analysis With Implications for Understanding Suicidal Behavior.

ARTICLE *in* JOURNAL OF ABNORMAL PSYCHOLOGY · OCTOBER 2014

Impact Factor: 4.86 · DOI: 10.1037/a0037480 · Source: PubMed

4 AUTHORS, INCLUDING:

Michael D Anestis
University of Southern Mississippi
76 PUBLICATIONS **1,043** CITATIONS

SEE PROFILE

Journal of Abnormal Psychology

The Modal Suicide Decedent Did Not Consume Alcohol Just Prior to the Time of Death: An Analysis With Implications for Understanding Suicidal Behavior

Michael D. Anestis, Thomas Joiner, Jetta E. Hanson, and Peter M. Gutierrez

Online First Publication, October 6, 2014. http://dx.doi.org/10.1037/a0037480

Journal of Abnormal Psychology

http://dx.doi.org/10.1037/a0037480

BRIEF REPORT

The Modal Suicide Decedent Did Not Consume Alcohol Just Prior to the Time of Death: An Analysis With Implications for Understanding Suicidal Behavior

Michael D. Anestis
University of Southern Mississippi

Thomas Joiner
Florida State University and Military Suicide Research Consortium, Tallahassee, Florida

Jetta E. Hanson
Military Suicide Research Consortium, Tallahassee, Florida

Peter M. Gutierrez
Denver VA Medical Center MIRECC, Denver, Colorado, Military Suicide Research Consortium, Denver, Colorado, and University of Colorado School of Medicine

We identified and analyzed a total of 92 studies, representing 167,894 suicide decedents, to determine if there is evidence to support what appears to be a widely held cultural, clinical, and scholarly view that many people who die by suicide had been drinking at the time of death. It was determined that, based on weighted averages, approximately 27% of suicide decedents had above-zero blood alcohol concentrations (BACs) at the time of death. We emphasize that it was not 27% who were intoxicated at the time of death; rather, 27% had above-zero BACs and 73% had BACs of 0.00%. Among studies of suicide decedents, BACs differed as a function of race (higher in non-White individuals). We conclude that the role of alcohol use at the time of death may be less than some assume, and this interpretation can inform clinical practice and theories of suicide. Important unanswered questions are posed which will help refine research in this area going forward.

Keywords: suicide decedents, blood alcohol content, meta-analysis

> . . . it is altogether possible that the drunken man may be less sure of success in his attempts at self-destruction than the man in complete control of his mental faculties (Cavan, 1928, p. 290).

Although difficult to support empirically, it appears that a number in clinical practice assume that alcohol and suicide often go hand-in-hand. One perspective is that consumption of alcohol facilitates engagement in potentially lethal self-harm by lowering one's inhibitions (Goldsmith, Pellmar, Kleinman, & Bunney, 2002) and making it easier to overcome the inherent fear of death with which humans are endowed (Joiner, 2005). Some also argue that alcohol's effects on fine motor control may lead to accidental self-directed violence when people injure themselves during the process of contemplating suicide (e.g., mistakenly placing too much pressure on a gun's trigger; Welte, Abel, & Wieczorek, 1988). There is also a sense that the lethality of suicide attempts may be increased because of the presence of alcohol in the system when one overdoses on a medication. On the surface, all three assertions appear logical and as cited above the first two have some support in the literature.

Evidence also exists in the literature which contradicts the afore-mentioned assumptions. For example, those diagnosed with substance dependence are less likely to make an impulsive attempt than those without the diagnosis (Conner et al., 2006). This seems to argue against alcohol facilitating impulsive or accidental suicide attempts in the moment, as those with substance use disorders are likely consuming substances during a greater percentage of the day than those who are not dependent, yet are not engaging in a great percentage of impulsive suicide attempts. Lending further support to this counterargument are findings from a Swedish study (Ostrom, Thorson, & Eriksson, 1996) of suicide decedents which found higher urine than blood alcohol concentrations. Because blood alcohol concentration increases after consumption and urine concentration after metabolization, these findings should be re-

Michael D. Anestis, Department of Psychology, University of Southern Mississippi; Thomas Joiner, Department of Psychology, Florida State University and Military Suicide Research Consortium, Tallahassee, Florida; Jetta E. Hanson, Military Suicide Research Consortium, Denver, Colorado; Peter M. Gutierrez, Denver VA Medical Center MIRECC, Denver, Colorado, Military Suicide Research Consortium, Denver, Colorado, and Department of Psychiatry, University of Colorado School of Medicine.

This work was in part supported by the Military Suicide Research Consortium (MSRC; USARMC awards W81XWH-10-2-0178 and W81XWH-10-2-0181), Department of Defense, and VISN 19 Mental Illness Research, Education, and Clinical Center (MIRECC), but does not necessarily represent the views of the Department of Defense, Department of Veterans Affairs, or the United States Government.

Correspondence concerning this article should be addressed to Peter M. Gutierrez, Denver VA Medical Center, MIRECC, 1055 Clermont Street, Denver, CO 80220. E-mail: peter.gutierrez@va.gov

versed if alcohol was facilitating impulsive suicide attempts. Such evidence seems to argue against the use of alcohol to directly facilitate impulsive suicidal behavior; however, it is possible that alcohol is not frequently utilized in a facilitative manner in attempts involving substantial planning either. Because the role of alcohol in suicide deaths is unclear, we undertook a comprehensive evaluation of the literature on the association between blood alcohol content and suicide to help researchers and clinicians understand the nature and extent of the association. Additionally, there are questions about the distal versus proximal effects of alcohol as a risk factor for suicide (Hufford, 2001). Examining blood alcohol content at the time of suicide will help shed preliminary light on this issue. We opted to consider drinking (positive blood alcohol concentration) rather than intoxication for two reasons. First, doing so would expand the number of studies from which sufficient data are available for analysis, thereby allowing for a larger sample size and greater probability of detecting any influence of alcohol on suicide. Second, the simple presence of alcohol represents a more stringent test of its influence, as an argument could be made that individuals who drink in small doses just prior to suicidal behavior are doing so to facilitate the action despite their lack of intoxication. Given the increased rate of death by suicide in individuals with a history of alcohol dependence (e.g., Borges et al., 2010; Borges, Walters, & Kessler, 2000)—which we do not dispute—and the percentage of the day during which such individuals typically exhibit a positive blood alcohol concentration including all decedents with nonzero blood alcohol levels seems likely to substantially decrease the odds of our data spuriously understating the role of alcohol in suicidal behavior.

Method

Data Extraction

A targeted search was conducted using databases available through a university library system to identify human studies reporting blood alcohol concentration (BAC) and suicide as a method of death. The following databases were searched: PubMed, Psych INFO, Ovid Medline, and Google Scholar. The terms used in these searches were BAC and blood alcohol content paired with variations of the word "suicide" (e.g., "suicidal"). Studies were included if they were (a) English language, (b) human subjects, (c) reported percentage of decedents with blood alcohol levels, and (d) accounted for how many of those decedents died by suicide. Three of the four authors reviewed the identified 92 articles ranging from 1979 to 2012. We chose 1979 as the beginning of the range due to the lack of relevant published studies prior to that and concerns about quality of both suicide designations and BAC assays. The articles totaled 167,894 individuals included in our analyses.

The 92 articles were then divided among the authors. A random selection of articles was first read by multiple authors and compared, to determine if we could identify and extract the variables of interest. Once we determined this was possible, the remaining articles were divided among the authors for variable extraction. The following variables were recorded: year (i.e., year article published), number of decedents who died by suicide (i.e., total sample size), method of suicide (i.e., various, hanging, gunshot, overdose, fall from height, electrocution, drowning, carbon monoxide poisoning, plastic bag asphyxia, airplane crash, sharp objects, self-immolation, motor vehicle crash, railway), gender (i.e., percent male), age (i.e., average age of suicide decedents), race (i.e., percent White), country (i.e., country in which data collected), and presence of alcohol (i.e., percent of decedents with nonzero BAC). These variables were then put into an SPSS database for later analysis.

The average number of suicide decedents per study was 1,824.94 (SD = 6,488.59) and ranged from 6 to 57,813. On average, 74.77% of the participants in each study were male (SD = 15.27)—an expected gender ratio in suicide decedents—with a mean age of 41.99 (SD = 14.80).

Data Analytic Plan

To determine the degree to which suicide decedents typically present with positive BAC levels, we calculated weighted means by sample size. Positive BACs (i.e., nonzero) were selected because actual BAC levels are rarely published and limiting analyses to that variable would have potentially reduced our ability to detect important influences of alcohol consumption beyond the effects of intoxication. To determine the degree to which demographic variables were associated with positive BACs, we ran a series of Pearson correlations for age, year of publication, percentage male, and percentage White.

Results

In the 92 studies (see Table 1) in which sufficient data were available for our analyses, an average of 32.39% of suicide decedents exhibited a positive BAC (SD = 14.77). When weighted for sample size, however, the average fell to 26.86%.[1] Examination of demographic factors indicated that sex (r = .05; p = .65), age (r = −.17; p = .21), and year of publication (r = .03; p = .80) were not significantly correlated with the percentage of suicide decedents with positive BAC. Race, however, was significantly correlated with the percentage of suicide decedents with positive BAC (r = −.54; p = .001) with samples in which a higher proportion of decedents were White associated with a lower frequency of positive BACs.

Discussion

A review of 92 published studies representing almost 170,000 suicide decedents established that a proportion of suicide decedents have positive BAC at the time of death. No evidence was found to support that sex influences the likelihood of positive BAC at the time of death, although that may be due to the preponderance of decedents being male across samples. Given the time period covered by this review, one might predict that publication bias influenced the results, but no association was found between year of publication and percentage of suicide decedents with positive

[1] Although not primary analyses, we were curious about positive BAC with other causes of death. Therefore, in comparison, in the 15 studies with sufficient data, results indicated that an average of 37.92% (weighted mean = 31.7%) of accident decedents exhibited positive BACs and, in the 18 studies with sufficient data results indicated that an average of 43.91% (weighted mean = 37.7%) of homicide decedents exhibited positive BACs. These rates were significantly greater than the rate at which a positive BAC was present in suicide decedents.

Table 1
Summary of Decedent Characteristics in Included Studies

Study	*N*	Method	% Male	Age	% White	Country	% with + BAC
Armour (1996)	103	Gunshot	95.00	30.00	—	Northern Ireland	39.80
Avis (1993)	22	Drowning	63.63	56.70	—	Canada	9.10
Avis (1994)	56	Gunshot	—	—	—	Canada	98.20
Azmak et al. (2006)	56	Hanging	83.90	41.60	—	Turkey	8.90
Bedford et al. (2006)	29	Various	—	—	—	Ireland	55.50
Bennett & Collins (2001)	67	Various	85.00	73.00	94.00	USA	24.00
Bilban & Skibin (2005)	449	Various	—	—	—	Slovenia	74.20
Brent et al. (1987)	141	Various	—	18.00	—	USA	31.90
Bullock & Diniz (2000)	77	Plastic bag asphyxia	57.30	60.20	—	Canada	35.10
Burrows et al. (2003)	987	Various	44.40	—	45.50	South Africa	40.20
Busuttil et al. (1994)	79	Carbon monoxide	89.90	—	—	Scotland	46.80
Byard et al. (2001)	123	Drowning	61.79	50.50	—	Australia	20.30
Byard et al. (2002)	51	Sharp objects	68.60	49.00	—	Australia	23.00
Cachamovich (2012)	637	Various	82.90	42.00	—	USA	24.80
Chan et al. (2008)	25	Electrocution	80.00	58.00	—	Australia	24.00
Copeland (1985)	65	Various	63.10	17.70	90.80	USA	30.80
Copeland (1987)	68	Drowning	58.60	60.00	71.40	USA	44.30
Copeland (1989)	70	Intentional fall	65.90	61.00	95.10	USA	11.43
Cortes et al. (2011)	240	Various	85.00	20.30	26.90	USA	31.60
Crombie et al. (1998)	349	Various	71.00	—	—	Scotland	45.00
Crosby et al. (2009)	13,208	Various	—	—	69.40	USA	33.20
Cryan et al. (2010)	15	Various	—	—	—	Ireland	40.00
Darke et al. (2009)	1,415	Various	81.50	36.50	—	Australia	40.60
Darke et al. (2009)	1,226	Various	80.70	36.20	—	Australia	38.70
Darke et al. (2010)	50	Overdose	70.00	34.30	—	Australia	42.00
Davis (1999)	25	Drowning	56.00	74.00	—	USA	24.00
Dhossche et al. (2001)	333	Various	78.00	45.00	78.00	USA	33.00
Dhossche et al. (2001)	522	Various	76.00	—	87.00	USA	32.00
Dumser et al. (1998)	29	Various	76.00	—	—	Germany	17.00
Fanton et al. (2007)	137	Intentional fall	43.00	50.00	—	France	23.00
Ford et al. (1979)	2,556	Various	68.11	—	90.26	USA	27.43
Fudalej et al. (2009)	162	Various	70.40	42.00	—	USA	39.50
Gorniak et al. (2005)	26	Drowning	69.00	40.00	62.00	USA	27.00
Guarner & Hanzlick (1987)	56	Hanging	89.29	31.00	57.10	USA	34.00
Haddix et al. (1996)	51	Plastic bag asphyxia	47.00	72.00	98.10	USA	19.60
Harruff et al. (1994)	12	Gunshot	100.00	30.00	71.00	USA	50.00
Haywards et al. (1992)	509	Various	80.30	41.30	—	Australia	35.80
Hernetkiski & Keskinin (1998)	106	Motor vehicle crash	90.00	30.00	—	Finland	22.00
Hlady et al. (1988)	169	Various	—	—	65.60	USA Alaska	59.00
Holmgren et al. (2010)	11,441	Various	71.13	51.30	—	Sweden	34.00
Jones et al. (2000)	30	Plastic bag asphyxia	66.67	50.00	—	Scotland	36.67
Kaplan (2012)	57,813	Various	78.50	47.00	—	USA	15.40
Karch et al. (2006)	5,213	Various	—	—	83.29	USA	33.52
Karch et al. (2008)	6,455	Various	78.80	—	88.70	USA	32.00
Karch et al. (2009)	6,234	Various	78.10	—	84.90	USA	33.30
Karch et al. (2010)	6,366	Various	78.00	—	85.00	USA	34.50
Karch et al. (2011)	6,876	Various	78.10	—	85.20	USA	33.30
Karsson (1998)	102	Sharp objects	78.00	50.00	—	Sweden	15.70
Kohlmeier et al. (2001)	1,641	Gunshot	83.20	42.60	95.20	USA	35.00
Koronfel (2002)	188	Various	83.50	—	—	Dubai	28.00
Kubo et al. (1991)	265	Various	61.51	63.46	—	Germany	30.94
Lecomte & Fornes (1998)	392	Various	66.67	22.00	82.00	France	30.00
Lerer & Matzopoulos (1997)	30	Railway	78.00	30.00	—	South Africa	10.00
Levine et al. (2005)	907	Various	—	—	—	USA	26.90
Lewis et al. (2007)	14	Airplane crash	100.00	40.00	—	USA	28.50
Lindeman et al. (1997)	141	Various	73.00	47.00	—	Finland	20.60
Loftus & Dada (1992)	34	Various	—	—	—	South Africa	29.40
Luke et al. (1985)	61	Hanging	83.61	41.30	96.72	USA	26.23
Lunette et al. (2001)	14,053	Various	92.00	—	—	Finland	27.60
Lynch (1987)	121	Various	100.00	28.00	—	United Kingdom	14.98
May et al. (2002)	347	Various	—	—	0.00	USA	69.16
Mishara (1999)	78	Railway	61.00	38.00	—	Canada	25.60
Karch et al. (2006)	5,416	Various	—	—	—	USA	33.33

(*table continues*)

Table 1 (*continued*)

Study	*N*	Method	% Male	Age	% White	Country	% with + BAC
Narongchai et al. (2006)	116	Various	—	—	—	Thailand	9.50
Nordum et al. (2000)	109	Various	80.00	41.00	—	Norway	38.10
Norton et al. (1992)	25	Various	—	—	—	USA	32.00
Ohberg et al. (1996)	1,348	Various	76.60	—	—	Finland	35.90
Olson et al. (1999)	313	Various	0.00	—	—	USA	34.50
Ostrom et al. (1996)	193	Carbon monoxide	88.88	43.00	—	Sweden	51.00
Penttila et al. (1989)	279	Various	—	—	—	Finland	42.65
Perrett et al. (2006)	27	Various	77.00	19.00	—	Sweden	41.00
Pirkola et al. (2000)	948	Various	77.00	45.00	—	Finland	39.00
Przepyszny & Jenkins (2007)	31	Carbon monoxide	67.70	48.00	93.50	USA	35.00
Pukilla et al. (2000)	1,515	Various	81.90	—	—	Finland	44.69
Rainio & Sanjantila (2005)	305	Gunshot	95.00	45.00	—	Finland	52.00
Rothschild et al. (2001)	39	Self-immolation	76.00	43.40	—	Germany	33.00
Rutledge & Messick (1992)	1,680	Various	—	—	—	USA	23.60
Scribante et al. (2004)	889	Various	78.00	36.60	57.00	South Africa	39.00
Shiang et al. (1997)	922	Various	75.00	49.00	86.65	USA	27.87
Shields et al. (2006)	466	Various	87.00	21.00	90.00	USA	33.00
Shields et al. (2006)	2,722	Various	81.70	42.00	94.80	USA	38.10
Shields et al. (2007)	28	Various	62.10	41.60	86.20	USA	14.30
Singh et al. (2008)	433	Various	79.00	16.00	38.00	USA	20.00
Sjogren et al. (2000)	5,720	Various	70.00	—	—	Sweden	34.30
Start et al. (1992)	28	Sharp objects	75.00	46.86	93.00	United Kingdom	0.00
Tse et al. (2011)	100	Hanging	90.00	40.90	—	Australia	38.00
Turk & Tsokos (2004)	34	Intentional fall	56.00	—	100.00	Germany	18.00
Vougiouklaklas et al. (2009)	21	Various	81.00	20.30	—	Greece	52.40
Wanta et al. (2009)	222	Various	85.00	76.00	98.00	USA	15.80
Welte et al. (1988)	806	Various	68.50	40.00	89.30	USA	33.00
Wirthwein et al. (2002)	50	Drowning	54.00	—	73.10	USA	42.00
Wyatt et al. (1998)	6	Hanging	100.00	12.00	—	Scotland	0.00

Note. *N* = number of suicide decedents in sample; Method = suicide method within sample; Country = country from which sample was obtained; % with + BAC = percentage of sample exhibiting positive (>0) blood alcohol content.

blood alcohol concentration, arguing against that prediction. On balance, the results lead to the conclusion that alcohol consumption is one of many potential influences on suicide. Less than one third of those who die by suicide have positive blood alcohol at the time of death. It is perhaps revealing that the weighted mean percentage of suicide decedents with positive BAC was lower than the raw mean percentage of suicide decedents with positive BAC, meaning that the larger and potentially more sensitive studies returned lower percentages. However, we recognize that given the variable designs of the included studies, the basic statistical assumption that large samples yield greater sensitivity may not apply. Only one factor was found that influenced differences in the proportion of decedents with positive blood alcohol content. Race appears to be important in that the higher the proportion of White the lower the frequency of positive blood alcohol. This may be the result of minorities having higher rates of alcohol abuse (Caetano, & Clark, 1998), or it could indicate cultural differences in how alcohol use and suicide interact. However, more recent research indicates a fairly complex interaction between race, ethnicity, and suicide supporting the explanation that it is more than just a question of higher minority rates of alcohol misuse (Chartier & Caetano, 2010; Grant et al., 2004). An extensive review of the literature on problems with alcohol use in African Americans compared with European Americans (Zapolski, Pedersen, McCarthy, & Smith, 2014) further highlights the complex nature of substance abuse and the importance of considering multiple variables (e.g., gender, socioeconomic status) in addition to alcohol-specific variables. Because we were unable to perform fine grained analyses by race across samples, it seems wise to conclude that multiple factors are likely at play and we cannot provide a definitive explanation for this finding.

Although the data did not allow for an examination of whether method of suicide demonstrated differences in the percentage of decedents with positive blood alcohol content, this is an interesting question for future research. Additionally, if we were able to compare the percentage of victims of various methods with positive blood versus urine alcohol content or the mean BAC level in decedents using different methods arguments might be made for particular causal links. Those data could provide evidence of where in the suicide process alcohol exerted its influence. Indeed, we believe the use of alcohol may interfere with the implementation of a planned behavior and, in combination with the fear generally involved in a suicide attempt (e.g., Joiner, 2005), the likelihood of an attempt occurring may actually decrease. Unfortunately, the available data did not allow for a test of this hypothesis, so it is offered as a suggestion for future research.

As previously stated, we were interested in determining the percentage of those who died by suicide who had measurable levels of alcohol in their systems when they died. In the reviewed studies, positive blood alcohol content at the time of death was the variable of interest, as opposed to intoxication. Intoxication requires more than a detectable level of alcohol in the blood, and the available data do not allow us to determine what percentage of those who were positive also met criteria for intoxication. Only one study (Ostrom et al., 1996) compared blood and urine levels, and their findings did not support intoxication as the causal mech-

anism. Because roughly one fourth of suicide decedents represented by the reviewed studies had nonzero BACs at the time of death, we conclude that alcohol consumption may not be a prominent proximal suicide risk factor.

Alcohol use problems elevate the risk of eventual suicide (Borges et al., 2010, 2000). Some people die with positive BACs, although most have not consumed alcohol prior to suicide. As a result, clinicians should probably view alcohol abuse as one of many potentially important risk factors. Therefore, their assessments should seek to determine the extent to which alcohol abuse is a primary driver (Jobes, 2006) of suicide risk for the individual patient. Alcohol abuse or dependence is relevant in terms of an individual's overall risk profile (Hufford, 2001), but may not be useful as a warning sign (Rudd et al., 2006) for suicide. A recent study using a timeline follow-back methodology to gain detailed information about the 24 hr just prior to a nonlethal suicide attempt suggests one possible way to sort out the risk factor versus warning sign question (Bagge, Littlefield, Conner, Schumacher, & Lee, 2014). The authors found that, when adjusting for prior hour ideation, alcohol consumption was associated with about a 20% increase in risk of ideation in a subsequent hour. Unfortunately, their results do not indicate the proximity of consumption to attempt. But in support of our findings, approximately one third of the attempters in their sample consumed alcohol at some point in the 24 hr prior to making an attempt. Therefore, given the likelihood of an individual being diagnosed with an alcohol use disorder exhibiting a positive BAC at any moment and the increased rate of death by suicide in individuals with alcohol use disorders, the low percentage of suicide decedents who exhibited positive BAC in our sample is a notable contrast to what would be expected if alcohol consumption were a prominent risk factor for suicide. Underlying factors which lead to alcohol misuse may also be drivers of suicide, and hence treating them may also address suicide risk. Finally, clinicians should not assume that patients staying sober will prevent suicide.

Death by suicide is difficult. The process is often painful and terrifying and requires a willingness to inflict significant harm to one's body that exceeds the bounds of other acute self-destructive behaviors (e.g., nonsuicidal self-injury, purging). Indeed, human beings' basic nature is to survive. Our very genes drive us to engage in behaviors that increase the probability of passing along our genetic material to the next generation and nurturing our offspring until they are capable of surviving and thriving on their own. Suicidal behavior thus requires individuals to confront a great level of physiological and affective discomfort and to override the genetic imperative that underlies our species' evolution, survival, and day-to-day experiences. Suicidologists have been searching for decades to find the optimal mix of factors that best explains why people die by suicide. Although alcohol is undoubtedly a factor in this mix, the current findings argue against it necessarily being the primary one for the majority of those who die by suicide.

This review answered some important questions about the interplay of alcohol and suicide, but also raised questions to be answered by future research. An important next step is to make the distinction between positive blood alcohol and intoxication by recording the actual level rather than merely present or absent. Those data would allow research to examine an empirical criterion of intoxication and make more fine grained comparisons. Both the current findings and prior research, however, predict that this percentage would be low. For example, in a study comparing homicide ($n = 174$) and suicide ($n = 105$) decedents whose cause of death was a sharp object, Karlsson (1998) reported that only 6.6% of suicide decedents (mean BAC = .02, standard deviation = .05) as compared with well over half of homicide decedents (mean BAC = .14, standard deviation = .13) were clearly intoxicated at the time of death. It would also be useful to determine the percentage of suicide decedents meeting criteria for alcohol dependence because blood alcohol rates could be artificially inflated by those who are more likely to be positive regardless of what they are doing. These individuals will have a positive BAC a fairly high percentage of the time and are disproportionately represented in suicide decedents. Yet findings from prior research (e.g., Karlsson, 1998) suggest that alcohol dependent individuals may actually be making efforts to not ingest alcohol at the time of engaging in lethal self-harm. Studies designed to specifically test whether some people choose not to drink due to concerns about it interfering with their attempts/suicides could be quite informative. One method would be to examine BAC in relation to lethality of attempt in survivors.

More information is needed to determine how racial, ethnic, and cultural differences influence the relationship between blood alcohol and suicide. We also need to better understand how blood alcohol influences choice of method or outcome within any given method. Finally, a valid concern could be that, although many suicide decedents appear to not consume alcohol immediately prior to their death, they may consume other drugs. Our data did not represent a comprehensive review on this topic; however, data from the studies reviewed here indicated that suicide decedents do not frequently have positive blood concentrations for other drugs either (e.g., weighted means for THC, cocaine, and methamphetamines were all below 11%).

Alcohol consumption in the general population is not an uncommon or particularly noteworthy occurrence. Among individuals with mental disorders, alcohol consumption is even more common, although it is more frequently associated with problematic outcomes. At the tragically severe end of the continuum of mental illness—suicide decedents—one might thus expect to find a positive BAC at a relatively high frequency (i.e., alcohol as a proximal risk factor for suicide), particularly at stressful moments. Our data suggest that alcohol is one of multiple risk factors to consider, and that it may be proximal for some, it is also likely distal for others. This outcome would only be predicted within the context of a paradigm in which suicidal behavior is viewed as difficult and an outcome requiring a planned and deliberate pursuit of death. We encourage researchers and clinicians to carefully examine their beliefs about this topic in light of the presented findings and to consider the potential utility of adopting this paradigm with respect to both scientific and clinical endeavors. As Bagge, Littlefield, Conner, Schumacher, and Lee (2014) state, there are many potential mechanisms linking alcohol consumption to suicide-specific outcomes, but none have been empirically tested, a serious limitation to our current understanding of the problem.

References

Bagge, C. L., Littlefield, A. K., Conner, K. R., Schumacher, J. A., & Lee, H.-J. (2014). Near-term predictors of the intensity of suicidal ideation:

An examination of the 24 h prior to a recent suicide attempt. *Journal of Affective Disorders, 165,* 53–58. doi:10.1016/j.jad.2014.04.010

Borges, G., Nock, M. K., Abad, J. M. H., Hwang, I., Sampson, N. A., Alonso, J., & Kessler, R. C. (2010). Twelve month prevalence of and risk factors for suicide attempts in the WHO World Mental Health Surveys. *The Journal of Clinical Psychiatry, 71,* 1617–1628. doi: 10.4088/JCP.08m04967blu

Borges, G., Walters, E. E., & Kessler, R. C. (2000). Associations of substance use, abuse, and dependence with subsequent suicidal behavior. *American Journal of Epidemiology, 151,* 781–789. doi:10.1093/oxfordjournals.aje.a010278

Caetano, R., & Clark, C. L. (1998). Trends in alcohol consumption patterns among whites, blacks and Hispanics: 1984 and 1995. *Journal of Studies on Alcohol and Drugs, 59,* 659–668. Retrieved from http://www.jsad.com/jsad/downloadarticle/Trends_in_Alcohol_Consumption_Patterns_among_Whites_Blacks_and_Hispanics_/619.pdf

Cavan, R. (1928). *Suicide*. New York, NY: Russell and Russell.

Chartier, K., & Caetano, R. (2010). Ethnicity and health disparities in alcohol research. *Alcohol Research and Health, 33,* 152–160. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3887493/

Conner, K. R., Hesselbrock, V. M., Schuckit, M. A., Hirsch, J. K., Knox, K. L., Meldrum, S., . . . Soyka, M. (2006). Precontemplated and impulsive suicide attempts among individuals with alcohol dependence. *Journal of Studies on Alcohol and Drugs, 67,* 95–101. Retrieved from http://www.jsad.com/jsad/downloadarticle/Precontemplated_and_Impulsive_Suicide_Attempts_Among_Individuals_With_Alcoh/1038.pdf

Goldsmith, S. K., Pellmar, T. C., Kleinman, A. M., & Bunney, W. E. (2002). *Reducing suicide: A national imperative (Committee on Pathophysiology and Prevention of Adolescent and Adult Suicide, Board on Neuroscience and Behavioral Health, Institute of Medicine of the National Academies*). Washington, DC: National Academy of Sciences.

Grant, B. F., Dawson, D. A., Stinson, F. S., Chou, S. P., Dufour, M. C., & Pickering, R. P. (2004). The 12-month prevalence and trends in *DSM–IV* alcohol abuse and dependence: United States, 1991–1992 and 2001–2002. *Drug and Alcohol Dependence, 74,* 223–234. doi:10.1016/j.drugalcdep.2004.02.004

Hufford, M. R. (2001). Alcohol and suicidal behavior. *Clinical Psychology Review, 21,* 797–811. doi:10.1016/S0272-7358(00)00070-2

Jobes, D. A. (2006). *Managing suicidal risk: A collaborative approach*. New York, NY: Guilford Press.

Joiner, T. (2005). *Why people die by suicide*. Cambridge, MA: Harvard University Press.

Karlsson, T. (1998). Homicidal and suicidal sharp force fatalities in Stockholm, Sweden: Orientation of entrance wounds in stabs gives information in the classification. *Forensic Science International, 93,* 21–32. doi:10.1016/S0379-0738(98)00025-5

Ostrom, M., Thorson, J., & Eriksson, A. (1996). Carbon monoxide suicide from car exhausts. *Social Science and Medicine, 42,* 447–451. doi: 10.1016/0277-9536(95)00104-2

Rudd, M. D., Berman, A. L., Joiner, T. E., Nock, M. K., Silverman, M. M., Mandrusiak, M., . . . Witte, T. (2006). Warning signs for suicide: Theory, research, and clinical applications. *Suicide and Life-Threatening Behavior, 36,* 255–262. doi:10.1521/suli.2006.36.3.255

Weiss, R. D., & Hufford, M. R. (1999). Substance abuse and suicide. In D. J. Jacobs (Ed.), *The Harvard Medical School guide to suicide assessment and intervention* (pp. 300–310). San Francisco, CA: Jossey-Bass Publishers.

Welte, J., Abel, E., & Wieczorek, W. (1988). The role of alcohol in suicides in Erie County NY 1972–84. *Public Health Reports, 103,* 648–652. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1478134/pdf/pubhealthrep00167-0094.pdf

Zapolski, T. C. B., Pedersen, S. L., McCarthy, D. M., & Smith, G. T. (2014). Less drinking, yet more problems: Understanding African American drinking and related problems. *Psychological Bulletin, 140,* 188–223. doi:10.1037/a0032113

Received December 16, 2013
Revision received June 5, 2014
Accepted June 6, 2014 ■

Journal of Abnormal Psychology
2015, Vol. 124, No. 2, 460–461

http://dx.doi.org/10.1037/abn0000062

Response to Commentary on "The Modal Suicide Decedent Did Not Consume Alcohol Just Prior to the Time of Death: An Analysis With Implications for Understanding Suicidal Behavior"

Michael D. Anestis
University of Southern Mississippi

Thomas Joiner
Florida State University and Military Suicide Research Consortium, Tallahassee, Florida

Jetta E. Hanson
Military Suicide Research Consortium, Denver, Colorado

Peter M. Gutierrez
Denver VA Medical Center–MIRECC, Denver, Colorado, Military Suicide Research Consortium, Tallahassee, Florida, and University of Colorado School of Medicine

A commentary on our article, "The Modal Suicide Decedent Did Not Consume Alcohol Just Prior to the Time of Death: An Analysis with Implications for Understanding Suicidal Behavior," published in this issue, was reviewed. We agree with the authors of that commentary regarding a coding error that has now been corrected. While we disagree with several of the points raised by the authors, the majority of our disagreements lie in how the results of our original study are being interpreted. We provide a point-by-point response to that commentary and thank the authors for advancing scientific debate on what we view as a very important issue in understanding the role of alcohol as a risk factor for suicide.

Keywords: response to commentary, blood alcohol concentration, suicide

We appreciate the opportunity to respond to the thoughtful commentary regarding our initial article (Anestis, Joiner, Hanson, & Gutierrez, 2014). The authors of the commentary made several points, and we would like to take the opportunity to respond to each in turn.

The first point noted by the authors was that we made a miscalculation of the total percentage of decedents with a positive blood alcohol concentration (BAC) in a study utilizing National Violent Death Reporting System (NVDRS) data (Kaplan et al., 2013; labeled Kaplan et al., 2012, in our table because of its status as an online publication at the time of data coding). Having revisited this article, we have now arrived at the same numbers as the authors of the commentary. It appears that we erroneously divided the percentage with BAC levels above .08 g/dl by the full sample rather than the percentage with positive BAC by the members of the sample for whom BAC data were available. As the authors noted, this brings the weighted mean percentage of suicide decedents with positive BAC from 26.9% to 33.6%. This represents an improvement in our article's accuracy, but does not affect our main conclusion: that the modal suicide decedent had not consumed alcohol just prior to death.

Where we appear to disagree with the authors is in the implications of that number. The authors seem to believe that we have discounted alcohol as irrelevant to death by suicide; however, this is not the case. Indeed, as we note on page 5, "Our data suggest that alcohol is one of multiple risk factors to consider, and that [although] it may be proximal for some, it is also likely distal for others." We further noted on page 5 that "Suicidologists have been searching for decades to find the optimal mix of factors that best explains why people die by suicide. Although alcohol is undoubtedly a factor in this mix, the current findings argue against it necessarily being the primary one for the majority of those who die by suicide." Put another way, our primary aim was to dispel what we believe to be a widely held conviction that alcohol is frequently a primary and proximal factor leading to the emergence of death by suicide. The authors correctly note that a risk factor does not need to be modal to be relevant, a point we do not dispute. At the same time, we would note that the presence of a risk factor does not indicate a proximal and primary role for that variable in the development of a specific outcome and the presence (at any level) of that risk factor in a minority of cases represents a steep obstacle to models that conceptualize that variable as frequently causal.

The authors noted that the percentage of suicide decedents with a positive BAC (33.6%) and the percentage of accident decedents with a positive BAC (31.7%) were quite similar. We do not dispute this either. Most deaths by accident also do not occur immediately after alcohol consumption. Alcohol certainly can be problematic—the au-

Michael D. Anestis, Department of Psychology, University of Southern Mississippi; Thomas Joiner, Department of Psychology, Florida State University, and Military Suicide Research Consortium, Tallahassee, Florida; Jetta E. Hanson, Military Suicide Research Consortium, Denver, Colorado; Peter M. Gutierrez, Denver VA Medical Center–MIRECC, Denver, Colorado, Military Suicide Research Consortium, and Department of Psychiatry, University of Colorado School of Medicine.

Correspondence concerning this article should be addressed to Peter M. Gutierrez, Denver VA Medical Center–MIRECC, 1055 Clermont Street, Denver, CO 80220. E-mail: peter.gutierrez@va.gov

thors raised an interesting comparison with drunken driving—but the similarity in percentages does not speak to a similarity in the role of alcohol across these outcomes. Indeed, research has shown that alcohol has an impact on the ability to maintain a stable position on the road, the speed of breaking, a driver's capacity for detecting obstacles and obstructions on the road way, and other specific driving skills (e.g., Liguori, 2009; Martin et al., 2013; Ogden & Moskowitz, 2004). Similar research showing a specific role of alcohol in directly facilitating death by suicide is not only lacking, but is challenging to imagine. In this sense, we know that alcohol and suicide can co-occur, but there is less evidence that alcohol itself drives the emergence or lethality of the behavior. We agree that alcohol is unlikely to be helpful to a suicidal individual, but it is less clear that it causes suicidal behavior to occur the same way alcohol causes traffic deaths. The more important issue seems to be the lack of theory or empirical evidence regarding a mechanism by which alcohol might facilitate suicide. In the absence of such evidence, caution is warranted in interpreting any data regarding the percentage of suicide decedents with positive BAC. One could imagine laboratory experiments on the impact of alcohol consumption on executive functioning and suicidal ideation as a possible step in developing data on the causal relationship. In addition, it is reasonable to contend that alcohol use may worsen stressful life events, but that seems to be more of a chronic issue to us than a possible trigger for suicide. Such arguments and possible research are still far removed from demonstrating that alcohol is a key causal mechanism in suicide.

The authors continued their commentary through the discussion of six articles examining alcohol use and self-harm and suicidal behavior. Although we agree that these are interesting studies, four of them examined suicidal behavior in general and one examined self-injury. These constructs are not equivalent to death by suicide—an absolutely fundamental point—and we would argue that conflating these outcomes runs the risk of perpetuating the very myth that our article was intended to challenge. Whether or not acute alcohol consumption is a prominent proximal risk factor for nonlethal self-harm behaviors does not speak directly to whether or not it plays such a role in death by suicide. In addition, the studies cited by the authors reported relatively low frequencies for alcohol consumption in the hours immediately prior to nonlethal (26.5%–35.3%, Borges et al., 2004; Branas, Richmond, Ten Have, & Wiebe, 2011; Powell et al., 2001) and lethal (31.0%; Branas et al., 2011) suicidal behavior. Taken together, although these studies largely focus on behaviors distinct from death by suicide, they nonetheless seem entirely consistent with our contention that acute alcohol use does not play a proximal role in the large majority of suicide deaths.

The authors' final contention with our original article was with our claim that few studies have published data on BAC levels (vs. simple presence/absence) in suicide decedents. The authors cited a single source utilized across multiple articles—the NVDRS—and noted that, within that sample, slightly less than two thirds of those with a positive BAC exhibited BAC levels above .08 g/dl. Given the weighted mean of 33.6% of decedents with a positive BAC, if the 64.5% figure drawn from a strictly U.S. sample applies globally, this would equate to 21.7% of suicide decedents exhibiting BAC levels above .08 g/dl at the time of death. Here again, this does not seem to dispute our point that the modal suicide decedent did not consume alcohol just prior to death. Furthermore, given non-U.S. data demonstrating higher urine than BACs in suicide decedents (Oström, Thorson, & Eriksson, 1996), the generalizability of the NVDRS data is not entirely clear.

Ultimately, we believe we have more agreement than disagreement with the authors of the commentary. We agree that it is important not to understate the role of acute alcohol use or any other potential risk factor for suicide. At the same time, we think it is important to challenge what we believe, based on our many years' experience in the field, to be widely held but empirically unsupported contentions regarding the precipitating factors driving most suicide deaths and see our work as an effort to place one variable—acute alcohol use—within its proper context.

References

Anestis, M. D., Joiner, T., Hanson, J. E., & Gutierrez, P. M. (2014). The modal suicide decedent did not consume alcohol just prior to the time of death: An analysis with implications for understanding suicidal behavior. *Journal of Abnormal Psychology, 123,* 835–840. http://dx.doi.org/10.1037/a0037480

Borges, G., Cherpitel, C. J., MacDonald, S., Giesbrecht, N., Stockwell, T., & Wilcox, H. C. (2004). A case-crossover study of acute alcohol use and suicide attempt. *Journal of Studies on Alcohol, 65,* 708–714.

Branas, C. C., Richmond, T. S., Ten Have, T. R., & Wiebe, D. J. (2011). Acute alcohol consumption, alcohol outlets, and gun suicide. *Substance Use & Misuse, 46,* 1592–1603. http://dx.doi.org/10.3109/10826084.2011.604371

Kaplan, M. S., McFarland, B. H., Huguet, N., Conner, K., Caetano, R., Giesbrecht, N., & Nolte, K. B. (2013). Acute alcohol intoxication and suicide: A gender-stratified analysis of the National Violent Death Reporting System. *Injury Prevention, 19,* 38–43. http://dx.doi.org/10.1136/injuryprev-2012-040317

Liguori, A. (2009). Simulator studies of drug-induced driving impairment. In J. C. Verster, S. R. Pandi-Perumal, J. G. Ramaekers, & J. J. de Geir (Eds.), *Drugs, driving and traffic safety* (pp. 75–82). Basel, Switzerland: Birkauser Verlag. http://dx.doi.org/10.1007/978-3-7643-9923-8_5

Martin, T. L., Solbeck, P. A., Mayers, D. J., Langille, R. M., Buczek, Y., & Pelletier, M. R. (2013). A review of alcohol-impaired driving: The role of blood alcohol concentration and complexity of the driving task. *Journal of Forensic Sciences, 58,* 1238–1250. http://dx.doi.org/10.1111/1556-4029.12227

Ogden, E. J. D., & Moskowitz, H. (2004). Effects of alcohol and other drugs on driver performance. *Traffic Injury Prevention, 5,* 185–198. http://dx.doi.org/10.1080/15389580490465201

Oström, M., Thorson, J., & Eriksson, A. (1996). Carbon monoxide suicide from car exhausts. *Social Science & Medicine, 42,* 447–451. http://dx.doi.org/10.1016/0277-9536(95)00104-2

Powell, K. E., Kresnow, M. J., Mercy, J. A., Potter, L. B., Swann, A. C., Frankowski, R. F., . . . Bayer, T. L. (2001). Alcohol consumption and nearly lethal suicide attempts. *Suicide & Life-Threatening Behavior, 32*(Suppl.) 30–41. http://dx.doi.org/10.1521/suli.32.1.5.30.24208

Received February 2, 2015
Revision received March 30, 2015
Accepted March 31, 2015 ■

Reconsidering the Link Between Impulsivity and Suicidal Behavior

Michael D. Anestis, Kelly A. Soberay, Peter M. Gutierrez, Theresa D. Hernández and Thomas E. Joiner

Pers Soc Psychol Rev published online 26 June 2014
DOI: 10.1177/1088868314535988

Personality and Social Psychology Review
1–21

DOI: 10.1177/1088868314535988
pspr.sagepub.com

Reconsidering the Link Between Impulsivity and Suicidal Behavior

Michael D. Anestis[1], Kelly A. Soberay[2,3], Peter M. Gutierrez[2,3,4], Theresa D. Hernández[4], and Thomas E. Joiner[2,5]

Abstract

It is widely accepted that suicidal behavior often occurs with little planning. We propose, however, that suicidal behavior is rarely if ever impulsive—that it is too frightening and physically distressing to engage in without forethought—and that suicidal behavior in impulsive individuals is accounted for by painful and fearsome behaviors capable of enhancing their capacity for suicide. We conducted a meta-analysis of the association between trait impulsivity and suicidal behavior and a critical review of research considering the impulsiveness of specific suicide attempts. Meta-analytic results suggest the relationship between trait impulsivity and suicidal behavior is small. Furthermore, studies examining a mediating role of painful and provocative behaviors have uniformly supported our model. Results from our review suggest that researchers have been unable to adequately measure impulsivity of attempts and that measures sensitive to episodic planning must be developed to further our understanding of this phenomenon.

Keywords

suicide, impulsivity, acquired capability

Suicide is a global concern, resulting in the annual deaths of approximately one million individuals worldwide (National Institute of Mental Health, 2008). With this in mind, researchers have devoted substantial attention to the identification of risk factors for suicidal behavior. This work has yielded a growing list of variables linked to risk, including hopelessness (e.g., Beck, Steer, Kovacs, & Garrison, 1985), depression (e.g., Bostwick & Pankratz, 2000), non-suicidal self-injury (NSSI; Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006), thwarted belonging, and perceived burdensomeness (Joiner, 2005). Although the mechanisms through which these variables are thought to confer risk for suicidal behavior are often delineated and supported by empirical associations, this is not always the case. One variable for which this is noteworthy is impulsivity, which has been reported to be associated with suicidal behavior across a large number of studies (e.g., Dougherty et al., 2004).

Impulsivity is a broad construct defined and measured differently across investigations (Lynam & Miller, 2004). Definitions vary in emphasis, with some focusing on the act of engaging in risky behavior (e.g., Barratt, 1993), some focusing on the tendency to opt for smaller immediate rewards over longer term larger rewards (e.g., Bickel & Marsch, 2001), and some emphasizing the importance of specific affective states as influences over an individual's ability to inhibit sudden drives to engage in problematic behaviors (e.g., Whiteside & Lynam, 2001). Across theories, the construct of impulsivity is typically thought to involve several subcomponents (e.g., negative urgency, deficits in planning), nearly all of which involve a tendency to act without forethought (sensation seeking and lack of perseverance may represent exceptions; e.g., Whiteside & Lynam, 2001).

Several theories have been proposed to explain the mechanisms through which impulsivity might be associated with suicidal behavior. Virtually all of these include reference to a distal role for impulsivity but also posit a proximal relationship in which impulsivity explains the nature of the behavior itself. For instance, some researchers posit that the relationship is best thought to represent impulsive-aggression, a tendency to aggress toward others or oneself in response to acute stress (e.g., Mann & Currier, 2009). Consistent with this approach, some have proposed that deficient serotoninergic neurotransmission, represented by low cerebrospinal fluid 5-hydroxyindolacetic acid (CSF-5HIAA) levels, explains the relationship (e.g., Rifai, Reynolds, & Mann, 1992); however, empirical evaluations of this

[1]University of Southern Mississippi, Hattiesburg, USA
[2]Military Suicide Research Consortium, Denver, CO, USA
[3]Denver VA Medical Center MIRECC, CO, USA
[4]University of Colorado, Boulder, USA
[5]Florida State University, Tallahassee, USA

Corresponding Author:
Michael D. Anestis, Department of Psychology, University of Southern Mississippi, 118 College Drive Box #5025, Hattiesburg, MS 39406, USA.
Email: michael.anestis@usm.edu

conceptualization have not been consistently supportive (e.g., Roggenbach, Muller-Oerlinghausen, & Franke, 2002).

Relatedly, Baumeister (1990) proposed that suicide attempts represent an escape from aversive self-awareness and that individuals develop a diminished ability to resist impulses to engage in suicidal behavior while experiencing such a state and, as a result, become increasingly at risk for engaging in such behavior impulsively. Similarly, some believe that impulsivity serves as the diathesis in a diathesis-stress model in which stressors such as negative life events might interact with impulsivity to result in rash efforts to enact lethal self-harm (e.g., Mann, Waternaux, Haas, & Malone, 1999). In this conceptualization, suicidal behavior is viewed as a frequently unplanned behavioral response to momentary aversive experiences, more likely to occur in individuals who display a general tendency to act without forethought. Indeed, in explaining the role of impulsivity in suicidal behavior, Mann et al. (1999) noted that, due to their propensity toward impulsive action, suicide attempters "feel more suicidal and are more likely to act on feelings" (p. 186). Implicit in such a statement is the notion that suicidal behavior often emerges explosively in response to affect in people who are less capable of inhibiting rash responses to sudden urges. In addition, the same researchers proposed that planning and impulsive action are not mutually exclusive, stating that "the decision to act on a careful plan may be impulsive" (Mann et al., 1996, p. 582). This raises questions regarding the definition of impulsivity, as a decision to act on a plan previously developed in great depth seems to directly contrast many common conceptualizations of the construct (e.g., Whiteside & Lynam, 2001). In this review, the focus is on conceptualizations of impulsivity that emphasize the tendency to act without forethought.

A theme across each of the theories just described is the notion that people often engage in suicidal behavior without significant planning and that suicide attempts are often fueled by intense affective states. Indeed, the notion that suicidal behavior frequently occurs with little to no forethought is regularly noted as a statement of fact in literature reviews. For instance, Jeon and colleagues (2010) cited a number of studies detailed later in this review, noting that "with respect to the literature, studies have consistently reported that a considerable proportion of suicidal attempts are unplanned" (p. 275). Inherent in this viewpoint is the belief that suicidal behavior frequently occurs without any detectable progression from low to imminent risk. This supposition has obvious implications with respect to our understanding of risk factors related to imminent suicidal behavior and the role of clinicians in identifying and mitigating risk (A. R. Smith et al., 2008).

If an individual can engage in suicidal behavior without prior consideration, this speaks to the notion that momentary affective and/or cognitive states are capable of overcoming what many would argue is a fundamental component of human nature and an evolutionary imperative: the relentless will to remain alive (Joiner, 2010). Should such models prove untrue, however, the implication would be that, to override the drive to survive, an individual would need to chip away at it over time. In this article, we present an alternative model that argues that little, if any, suicidal behavior—lethal or non-lethal—occurs without substantial planning. Although further research testing important components of this model is needed, we argue that every effort to test it thus far has been supportive, whereas evidence that purportedly supports models proposing suicidal behavior is frequently impulsive is problematic.

The prominence of models that describe suicidal behavior as frequently impulsive is perhaps best seen through the frequent (and highly cited) efforts to measure impulsive suicidal behavior (e.g., Conner et al., 2007; de Leo, Cerin, Spathonis, & Burgis, 2005; Mann et al., 1996). Such studies have typically approached the association from one of two angles: the trait impulsivity of the individual or the degree to which specific acts of suicidal behavior were engaged in impulsively. We argue that the nature of the measures and the designs used in such investigations have precluded researchers from directly testing models that propose that suicidal behavior is frequently impulsive (see Figure 1a). Furthermore, we believe interpretations of published data have resulted in erroneous conclusions. In addition, we argue that a failure to consider plausible alternative models fully has fueled the belief that suicidal behavior frequently occurs impulsively. The purpose of this review is to consolidate findings, discuss their implications and limitations, and propose a new theoretical framework from which to consider the relationship between impulsivity and suicidal behavior (see Figure 1b).

To accomplish these goals, our article is divided into three separate sections. In the first section, we provide a meta-analysis that examines the strength of the relationship between trait impulsivity and suicidal behavior. We anticipate that this relationship will be small in magnitude, thereby highlighting the point that a general tendency to act impulsively is unlikely a central component of suicidal behavior. This analysis represents a critical first step in considering the relationship between impulsivity and suicidal behavior and the results could place the magnitude of this association into a clearer context. In the second section, we provide a critical review of literature examining the impulsiveness of specific suicide attempts. We show that the general pattern of findings reveals inconsistent definitions of impulsive suicidal behavior, problematic measurements of planning, and a pattern of results incompatible with the notion that suicidal behavior frequently occurs without extensive planning. In the final section of the article, we provide a description of our alternative conceptualization of the association between impulsivity and suicidal behavior and the empirical evidence underlying that conceptualization.

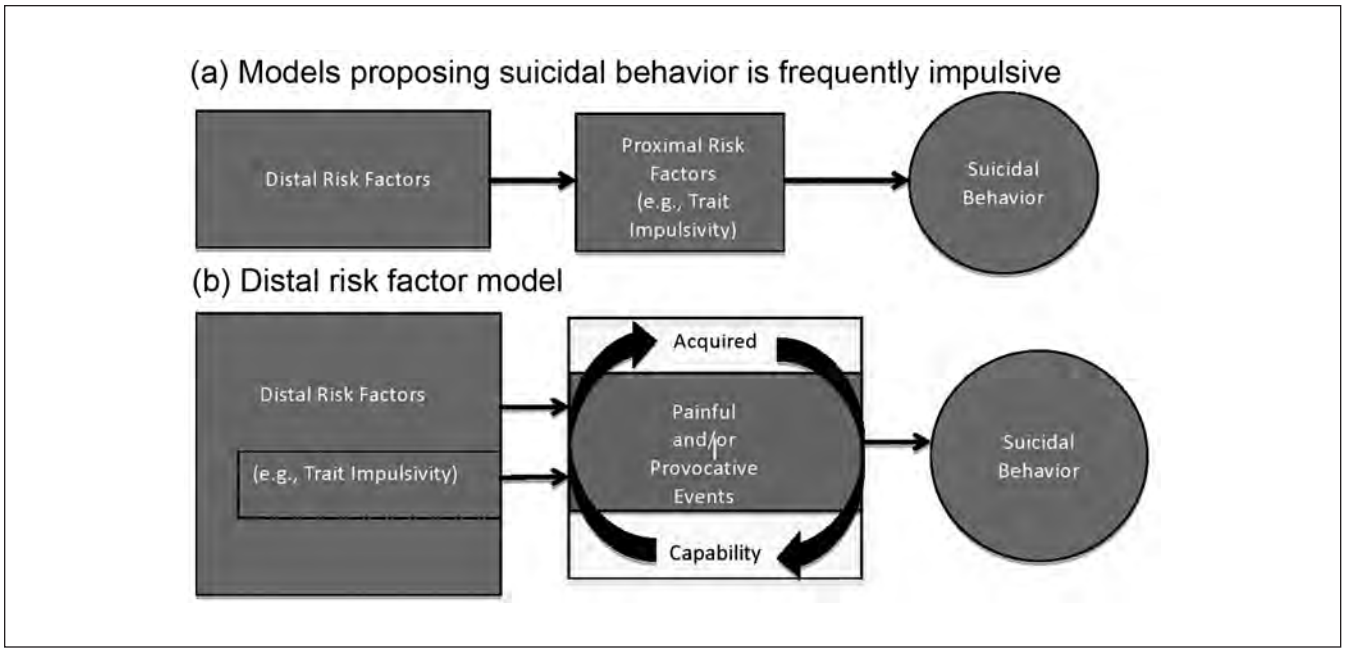


Figure 1. Two models of the relationship between impulsivity and suicidal behavior.
Note. In both models, impulsivity is defined as a tendency to act without forethought. Model a: In this more traditionally proposed model, impulsivity is a proximal risk factor, serving as a force or pressure and as such immediately precedes suicidal behavior in response to stress and/or aversive self-awareness (e.g., Baumeister, 1990; Mann, Waternaux, Haas, & Malone, 1999). In this model, there is a narrow window of opportunity and limited targets of opportunity (e.g., impulsivity immediately preceding suicidal behavior). This narrowness serves as an obstacle to clinical interventions aimed at reducing suicide risk and related behaviors. Model b: In this model, impulsivity is a trait that plays a facilitative role in other behaviors (i.e., painful or provocative events), which result in acquired capability. In this model, there is a larger window of opportunity and more targets for interventions aimed at reducing suicide risk and behaviors.

Meta-Analytic Review of Trait Impulsivity Findings

Study Selection

Trait impulsivity findings were reviewed meta-analytically. The inclusion criteria were the use of both a measure of suicidal behavior (e.g., non-lethal attempts; death by suicide) and impulsivity. Furthermore, results directly testing an association between impulsivity and suicidal behavior must have been included in the published manuscript. Studies that examined only suicidal ideation or suicide risk or which did not clearly differentiate suicidal behavior from other related variables (e.g., ideation, NSSI) were excluded. Using 53 databases (e.g., Pubmed, PsycInfo), we entered the search terms *suicide, suicidal behavior, impulsivity*, and *impulsive* (these same search terms were used to develop our systematic review). After examining the measures utilized in each study, we eliminated any that did not fit our criteria. At that point, we examined each study and excluded any that used our required measures (a measure of trait impulsivity and suicidal behavior) but did not provide results that tested an association between them. In an effort to ensure that our outcome variable was not overly broad, we restricted the studies in the meta-analysis to those that examined the presence/absence of suicidal behavior or frequency of suicidal behavior. Studies examining characteristics of suicidal behavior (e.g., medical lethality) were excluded. (Results from these and all other trait impulsivity studies, including which measure(s) was used, the nature of the study sample, and the size of the effect(s), can be found in the online Appendix). See Figure 2 for a description of the study selection process.

Data Extraction

For each study, data relevant for our meta-analysis were retrieved from the original study and entered into the statistical software (described below). When available, the mean and standard deviation for trait impulsivity and sample size for each group (suicidal behavior vs. no suicidal behavior) was recorded for each effect in each study. When such data were not available, odds ratios with 95% confidence intervals, *p* values with total sample size, or Cohen's *d* with sample size were recorded and imputed into the meta-analysis software.

Statistical Analysis

Data were analyzed using Comprehensive Meta-Analysis (CMA) 2.0 statistical software (Borenstein, Hedges, Higgins, & Rothstein, 2005). Hedges *g* was utilized to calculate the standardized mean difference on suicidal behavior outcomes,

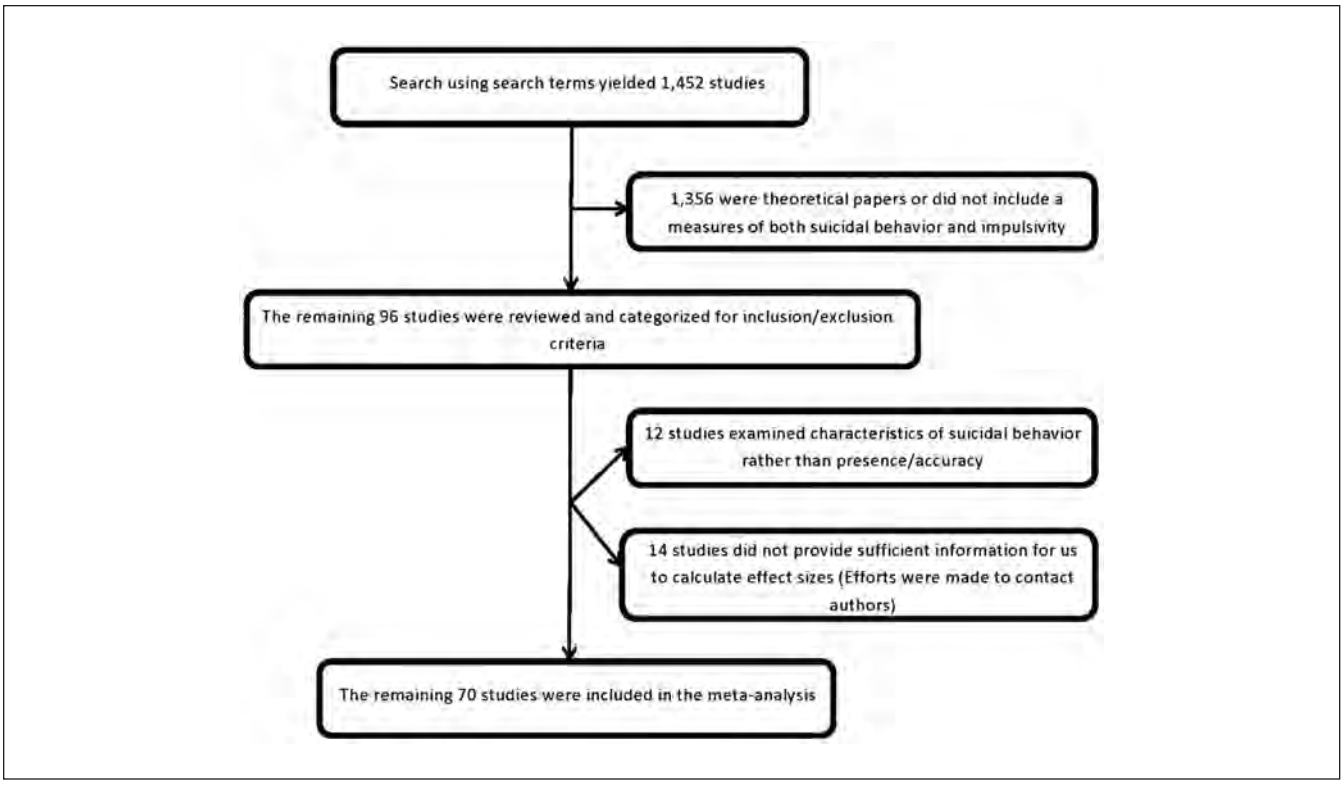


Figure 2. Flow chart for studies included and excluded from meta-analysis.

and we adhered to Cohen's (1988) description of small (g = .2), medium (g = .5), and large (g = .8) effects. Several studies included multiple effects based on different measures of impulsivity. Some meta-analysis experts have argued that, in such situations, the proper approach is to choose one representative effect from each study to avoid artificially inflating the weight of any study through consideration of inter-related effects (e.g., Cooper, 1998). Others, however, have argued that multiple effects from the same study can be included if authors believe or have evidence to support the possibility that the effects are entirely or almost entirely unrelated to one another (e.g., Gliner, Morgan, & Harmon, 2003). A third approach is to compute a mean effect size across effects within each study and then include only the grand mean value for each (e.g., Connor, Glatt, Lopez, Jackson, & Melloni, 2002). We opted to utilize one effect from each sample, as this appeared to be the most conservative approach and represented the most stringent challenge to our hypothesis (e.g., a single effect from a more psychometrically sound measure may yield a larger effect, which would contradict our hypothesis).[1] As a result, our findings represent analyses based on unique samples (e.g., participants were not represented multiple times across individual studies; see Table 1).

For studies in which one effect was selected from among several, we made an effort to select the effect that was most representative of the central tendency. In studies in which multiple self-report measures were utilized, we selected the Barratt Impulsiveness Scale (BIS; Patton, Stanford, & Barratt, 1995). Although this might cause the analysis to only reflect one of several conceptualizations of impulsivity, the BIS is by far the most frequently utilized measure in such studies (see online Appendix) and, as such, the analysis would also be the most representative of the literature as it is. Furthermore, analyses focused on any other self-report measure would be underpowered, thereby raising questions regarding the validity of the findings. In studies in which multiple behavioral measures were utilized, we selected the Immediate Memory Task (IMT; Dougherty, Marsh, & Mathias, 2002), as it appeared to maintain the most consistent relationship with suicidal behavior. If these measures were not utilized, we selected the largest effect in an effort to ensure that selections did not artificially weigh results in a direction that might be perceived as consistent with our model (e.g., decreasing the magnitude of the effect across studies). In studies in which both self-report and behavioral measures were used, we selected a behavioral measure based on the assumption that performance on such tasks avoids the drawbacks of self-report (e.g., lack of insight), thereby offering greater construct validity. In addition, in studies in which multiple diagnostic groups were represented (e.g., bipolar disorder and depression), we selected what we deemed to be the more clinically severe diagnostic group (e.g., bipolar disorder). Finally, when one study reported multiple effects on the same measure from multiple comparisons (e.g., multiple

Table 1. Results From Meta-Analyses Examining the Magnitude of the Association Between Trait Impulsivity and Suicidal Behavior.

Analysis	Type of study	*g*	CI	*z*	*p*	*Q*	I^2	*k*	*df*	FSN	FS *Z*	FS *p*
RE	1 effect per study	.34	[.24, .40]	9.75	<.001	684.82[a]	89.78	71	70	6,022	18.16	.0000
RE	Cross-sectional	.37	[.29, .46]	8.89	<.001	500.89[a]	88.82	57	56	4,031	16.60	.0000
RE	Prospective	.09	[.02, .17]	2.43	.015	9.50	36.83	7	6	17	3.59	.0003
RE	Psychological autopsy	.30	[−.13, .72]	1.36	.17	121.12[a]	95.05	7	6	80	6.88	.0000

Note. *g* = Hedges *g*, CI = 95% confidence interval; FSN = fail safe *n*; FS *Z* = *Z* test for Classic Fail Safe Test; FS *p* = *p* value for Classic Fail Safe Test; RE = random effects model; 1 effect per study = one effect selected from any study with more than one effect reported.
[a]Denotes heterogeneity test was significant.

attempters vs. single attempters vs. community controls), we used the suicidal and non-suicidal groups that were most similar to one another (e.g., single attempters vs. community controls) to compare groups that differ primarily on the outcome of interest (presence of suicidal behavior) as opposed to other potential confounding variables.

In an effort to assess the degree to which the magnitude of the relationship between trait impulsivity and suicidal behavior is consistent across type of study, we coded each effect as cross-sectional, prospective, or psychological autopsy. Follow-up meta-analyses were run to test the magnitude of the relationship between trait impulsivity and suicidal behavior within each of these groups.

Across each meta-analysis, effect sizes for each sample were weighted (for original effect sizes, see online Appendix), and we examined the significance of the Q-test to determine whether there was substantial heterogeneity of effect sizes. Because we anticipated that effect sizes would vary across studies, we opted to use a random effects (RE) model in each analysis. To test for publication bias, we examined funnel plots for each effect. In addition, we examined the significance of the fail safe test and reported the number of studies with non-significant effects that would be required to render the results non-significant.

Results

All meta-analytic results are presented in Table 1.

In our analysis, considering only one effect per study (n = 57), the Q-test was significant (684.82) and the I^2 value (89.78) indicated a substantial amount of that variability was due to heterogeneity rather than chance. The test of the null was significant, and the effect size was small (Hedges g = .34, 95% confidence interval [CI] = [.24, .40], p < .001). There was no evidence that publication bias significantly impacted our results.[2]

When considering only cross-sectional effects (n = 57), the Q-test was significant (500.89) and the I^2 value (88.82) indicated a substantial amount of that variability was due to heterogeneity rather than chance. For cross-sectional effects, the test of the null was significant and the effect size was small (Hedges g = .37, 95% CI = [.29, .46], p < .001). There was no evidence that publication bias significantly affected our results.

In the analysis including only prospective effects (n = 7), the Q-test was non-significant (9.50), indicating homogeneity across effect sizes. The test of the null was significant and the effect size was small (Hedges g = .09, 95% CI = [.02, .17], p = .015). There was no evidence that publication bias significantly affected our results.

In our analysis considering only psychological autopsy effects (n = 7), the Q-test was significant (121.12) and the I^2 value (95.05) indicated a substantial amount of that variability was due to heterogeneity rather than chance. The test of the null was non-significant (p = .17) and the effect size was small (Hedges g = .30, 95% CI = [−.13, .72], p = .42). There was no evidence that publication bias significantly affected our results.[3]

Discussion of the Meta-Analytic Review

The results indicate that, when considering trait impulsivity and suicidal behavior in general, the relationship is significant but small in magnitude. This result mirrors those from studies that specifically differentiated individuals who have and have not engaged in previous non-lethal suicidal behavior (cross-sectional) and studies that specifically differentiated between individuals who do or do not engage in suicidal behavior during a follow-up period (prospective). In psychological autopsy samples, however, where investigators attempt to differentiate between suicide decedents and living controls, the relationship is not statistically significant, indicating that trait impulsivity is not a reliable method by which to differentiate those who have and have not died by suicide. It is particularly difficult to reconcile this last point with models that conceptualize lethal self-harm as often being impulsive. To put such findings into context, other meta-analyses have found at least moderate effect sizes for the relationship between suicidal behavior and posttraumatic stress disorder, depressed mood, hopelessness, family history of suicide, and prior suicide attempts (e.g., Large, Smith, Sharma, Nielssen, & Singh, 2011; Panagioti, Gooding, & Tarrier, 2012). Other meta-analyses have found moderate effect sizes between components of impulsivity and pediatric weight status, bulimia nervosa, and problematic alcohol use (e.g., Stautz & Cooper, 2013; Thamotharan, Lange, Zale, Huffhines, & Fields, 2013). Exhibiting a less robust

relationship with suicidal behavior than the above-mentioned risk factors does not render the relationship between trait impulsivity and suicidal behavior meaningless, but it certainly calls into question its centrality. Indeed, our central thesis is not that trait impulsivity is irrelevant to suicidal behavior but rather that the relationship is indirect and distal.

Critical Review of Studies Examining Impulsivity of Attempts

In this section, we provide a critical review of findings from studies examining the impulsiveness of specific suicide attempts. We opted against using a meta-analysis in this section because such analyses measure the average strength of the relationship between two variables and the focus of this portion of the article was on the measurement and conceptualization of the impulsivity of attempts. In this sense, there was no second variable to which impulsivity of attempts was being compared. As noted earlier in the article, we anticipated that this review would yield an inconsistent definition of impulsivity of attempts, problematic measurement approaches, and a pattern of results that does not align well with the notion that suicidal behavior frequently occurs without extensive planning.

Study Selection

Inclusion criteria for studies examined in our critical review involved reporting of any results intended to measure the extent to which participants engaged in suicidal behavior that involved little to no planning. In some studies, the assessment approach involved the use of a measure designed to assess impulsiveness of attempts. In other cases, this included the interpretation of objective circumstances (e.g., distance of attempt from home) or involved one or more questions from within a broader measure. These criteria yielded 49 studies (see Table 2).

Summary of Results of Studies Examining the Impulsiveness of Specific Suicide Attempts

In studies that examined the impulsivity of specific suicide attempts, the general trend appears to indicate that attempts that involve less planning are associated with *less* severe outcomes. For instance, in a sample of individuals hospitalized for a suicide attempt, Baca-Garcia and colleagues (2001) found that impulsiveness of attempt was inversely associated with lethality of attempt. Similarly, in a sample of adult inpatients diagnosed with depression who had attempted suicide at least once, Nakagawa and colleagues (2009) found that less planning was associated with lower lethality. In addition, in a sample of 673 attempters, Conner and colleagues (2006) found that greater levels of planning were associated with greater lethality. The inverse relationship between impulsiveness of attempt and lethality of attempt has also been replicated in a sample of adolescents (Witte et al., 2008).

Studies examining the association between impulsiveness of attempts and psychopathology also fail to support the view that suicidal behavior is frequently impulsive. Across a variety of samples, more impulsive attempts were associated with lower depression scores (e.g., Brown, Overholser, Spirito, & Fritz, 1991; Conner et al., 2006; Jeon et al., 2010; Nakagawa et al., 2009; Simon et al., 2001; Soloff, Lynch, Kelly, Malone, & Mann, 2000; Suominen, Isometsa, Henriksson, Ostamo, & Lonnqvist, 1997; Wojnar et al., 2009; Wyder & de Leo, 2007; see Conner et al., 2007 and Giegling et al., 2009 for null findings). Similarly, Wojnar et al. (2009) found that impulsive attempters were less likely to report a family history of suicide or having experienced childhood sexual abuse, and Conner et al. (2006) reported that impulsive attempters were less likely to meet diagnostic criteria for substance dependence. Given that depression (e.g., Bostwick & Pankratz, 2000), substance use (Bagge & Sher, 2008), and a history of childhood sexual abuse (e.g., Joiner et al., 2007) are associated with severe suicidal behavior, these findings are evidence that individuals in particularly high-risk groups are *less likely* to engage in impulsive attempts. When considered within the context of these findings, models claiming suicidal behavior frequently occurs impulsively are particularly problematic, as such perspectives seem to suggest that a large proportion of attempts involve individuals with lower levels of psychopathology and fewer risk factors for severe, repeated, and lethal suicidal behavior.

Conceptual Issues With Studies Examining the Impulsiveness of Specific Suicide Attempts

Studies that examine impulsiveness of attempts differ in many ways, including the method of measurement and the proportion of attempts considered impulsive. In studies that dichotomized attempts as impulsive or non-impulsive, the proportion of attempts considered impulsive has ranged from 13% (Houston, Hawton, & Sheppard, 2001) to 97% (Razin et al., 1991). As such, there does not appear to be a consensus as to whether impulsive suicidal behavior is a rare phenomenon or representative of the vast majority of attempts. As we argue in greater detail below, we believe the actual proportion of attempts that can accurately be described as impulsive to be at or very close to 0%.

One explanation for this large discrepancy is likely the inconsistent operationalization of the time frame during which an individual must report having thoughts about attempting suicide. In some studies, participants are asked if they contemplated their attempt for longer than 15 min prior to attempting (e.g., Hawton, Kingsbury, Steinhardt, James, & Fagg, 1999). In others, the time frame ranges from "none;

Table 2. Results From Studies Examining Impulsivity of Attempts.

Authors	Measure of impulsivity	Attempt sample	% Impulsive
Baca-Garcia et al. (2001)	2-item SIS	478 attempters	55.0
Baca-Garcia et al. (2005)	8-item SIS	242 attempters	76.0
Bagge, Glenn, and Lee (2013)	2-item SIS	110 attempters	46.0
Brown, Overholser, Spirito, and Fritz (1991)	2-item SIS	86 adolescent attempters	66.3
Chen et al. (2007)	8-item SIS	148 suicide decedents	—
Chesin, Jeglic, and Stanley (2010)	8-item SIS	40 BPD attempters	—
Conner et al. (2005)	7-item SIS	505 suicide decedents	32.0
Conner et al. (2006)	Unpublished interview	673 attempters	51.0
Conner et al. (2007)	7-item SIS	117 depressed attempters aged 50+	—
Conwell et al. (2002)	Presence of loaded and/or unlocked guns in home	50 suicide decedents aged 50+	—
de Leo, Cerin, Spathonis, and Burgis (2005)	Method unspecified	399 attempters	—
Deisenhammer et al. (2009)	Unnamed number of SIS items	82 attempters	47.6
Dombrovski et al. (2011)	7-item SIS	29 depressed attempters aged 60+	—
Fazaa and Page (2011)	2-item SIS	96 undergraduate attempters	—
Giegling, Hartmann, Moller, and Rujescu (2006)	Unnamed number of SIS items	203 attempters	59.1
Giegling et al. (2007)	Unnamed number of SIS items	167 attempters + 92 decedents	61.0
Giegling et al. (2008)	Unnamed number of SIS items	144 attempters	60.5
Giegling et al. (2009)	Unnamed number of SIS items	111 attempters	58.6
Hall, Platt, and Hall (1999)	Unstructured interview	100 "severe" attempters	—
Hawton, Kingsbury, Steinhardt, James, and Fagg (1999)	1 item SIS	45 adolescents hospitalized for intentional overdose	83.3 multiple attempters; 70.4 first time attempters
Houston, Hawton, and Sheppard (2001)	Inquest notes	27 suicide decedents	13.0
Huan et al. (2004)	2-item SIS	100 attempters	26.0
Jeon et al. (2010)	Unpublished interview	208 attempters	36.0
Langhinrichsen-Rohling and Lamis (2008)	"Suicide interview"	39 youth attempters	83.0
Mann and Malone (1997)	8-item SIS	22 depressed attempters	—
Mann et al. (1992)	"First part" of SIS	53 attempters	66.7
Mann et al. (1996)	8-item SIS	49 attempters	—
Miranda et al. (2008)	Adolescent suicide interview	79 attempters	—
Nakagawa et al. (2009)	8-item SIS	151 depressed attempters	—
Nock et al. (2008)	WHO: CIDI	5,017 attempters	—
O'Donnell, Farmer, and Catalan (1996)	Unnamed number of SIS items; proximity to home	20 attempters who had jumped in front of a train	—
Pearson, Phillips, He, and Ji (2002)	Unpublished interview	147 female attempters	—
Raja and Azzoni (2004)	Unpublished questionnaire	80 attempters	48.8
Razin et al. (1991)	Unstructured interview	33 female adolescent attempters	97.0
Serretti et al. (2007)	Unnamed number of SIS items	167 attempters	61.0
Simon et al. (2001)	Unpublished interview	153 "nearly lethal" attempters	24.0
Soloff, Lynch, Kelly, Malone, and Mann (2000)	8-item SIS	92 attempters	—
Spokas, Wenzel, Brown, and Beck (2012)	1-item SIS	143 attempters	43.3
Stanley, Gameroff, Michalsen, and Mann (2001)	Unnamed number of SIS items	53 attempters	—
Suominen, Isometsa, Henriksson, Ostamo, and Lonnqvist (1997)	2-item SIS	114 attempters	44.0
Verkes et al. (1998)	8-item SIS	144 attempters	—
Westheide et al. (2008)	8-item SIS	29 depressed attempters	—
Weyrauch, Roy-Byrne, Katon, and Wilson (2001)	3-item SIS	99 attempters	—
Williams, Davidson, and Montgomery (1980)	Unpublished interview	350 attempters	40.4
Witte et al. (2008)	Unpublished interview	5,979 attempters	20.0
Wojnar et al. (2008) and Wojnar et al. (2009)	Unpublished interview	154 alcohol dependent attempters	62.0
Wong and Phillips (2009)	Unpublished interview	353 female attempters	—
Wyder and de Leo (2007)	Unpublished interview	112 attempters	26.0

Note. — = Author(s) did not dichotomize suicide attempts as impulsive/non-impulsive; SIS has been utilized using 1 item (premeditation), 2 items (also includes active preparation), 3 items (also includes suicide note), 7 items (also includes, isolation, timing, precautions against discovery, final acts in anticipation of death), and 8 items (also includes discussions of thoughts/plans with others). SIS = Suicide Intent Scale; BPD = borderline personality disorder; WHO: CIDI = World Health Organization Composite International Diagnostic Interview.

impulsive" (e.g., Brown et al., 1991) to less than 30 min (e.g., Wojnar et al., 2008), to less than 7 consecutive days prior to the attempt (e.g., Conner et al., 2006). Others consider the use of easily accessible means or locations close to home as evidence of impulsivity (e.g., Conwell et al., 2002; O'Donnell, Farmer, & Catalan, 1996). The use of close proximity to home is an indicator of an impulsive attempt is particularly problematic. O'Donnell and colleagues (1996) noted that the vast majority of attempts in their sample of 20 attempters who survived jumping in front of a train occurred at the station nearest to the attempter's home and concluded that these attempts were thus impulsive. Inherent in this viewpoint is the notion that planning a suicide attempt is positively correlated with distance from home, a point that lacks a clear rationale.

We contend that the very nature of suicidal behavior is such that little to none of it can truly be conceptualized as impulsive. Although people engage in suicidal behavior for many reasons, they likely boil down to finding a solution to a very serious problem (e.g., ending unbearable psychological pain; Jobes, 2006), which requires effortful thought. Thus, for suicidal behavior to be impulsive, it must occur in the absence of prior planning outside the moments and hours immediately preceding the behavior (i.e., consideration of methods and selecting the one to use). Even if the bulk of the planning occurs sporadically over an extended period long before the attempt and minimally or not at all immediately prior to the attempt, then the behavior should not be labeled impulsive. We are proposing a distinction that accounts for the intention of the behavior. To inflict serious enough self-harm to risk death, people must give very careful thought to what they are going to do and how they are going to do it. A counter-argument could be made that picking up a gun, pointing it at the body, and pulling the trigger does not require much planning and has a high probability of resulting in death without causing pain. In this sense, the boundary typically presented by overcoming pain and a potentially lengthy experience of pain is removed. However, the prospect of shooting oneself nonetheless involves overcoming the fear of death and massive bodily harm and, as such, we believe an individual could impulsively decide to pick up a gun, but would be unable to pull the trigger without enough rehearsal (mental and/or physical) and planning to diminish those fears.

Obstacles in Studies Examining Impulsivity of Attempts

Further complicating the conceptualization of impulsivity as it applies to suicidal behavior is a tendency for studies to refer to some attempts as impulsive regardless of previous ideation or planning. For instance, 51% of attempts in a study by Conner and colleagues (2006) were considered impulsive despite the fact that 58% of attempters indicated that they had developed a suicide plan prior to their attempt. This finding could indicate that some individuals spend extensive periods of time planning but experience intermittent periods of ideation. In this scenario, an extensively planned attempt may be preceded by a period of mild or even no ideation. In this sense, the findings would be driven by the fact that individuals are asked to consider only the moments immediately prior to an attempt, without noting the possibility that their thoughts developed over time and were episodic in nature. Indeed, de Leo et al. (2005) found that, in a sample of 11,572 participants responding to a telephone survey, only 20% of individuals with a prior history of suicidal behavior experienced risk as a phenomenon that developed consistently and without break, increasing in severity from the beginning to the end. In fact, 57.1% reported that their "suicidal process" fluctuated irregularly prior to their attempt, and only 0.8% reported experiencing no previous suicidal ideation or plan prior to their attempt. Furthermore, in a sample of 105 consecutive patients admitted to an Austrian hospital after a suicide attempt, Deisenhammer and colleagues (2009) reported that the "suicidal process" lasted less than 10 min for nearly 50% of their sample. However, when assessing suicidal process, they asked participants about the "first current emergence of suicidal thoughts," thereby precluding measurement of thoughts that developed episodically over time rather than building on one another increasingly over time. These methodological concerns raise an issue regarding the precise meaning of an impulsive attempt: Research that measures impulsivity of attempts often overlooks extensive periods of planning and consideration that do not immediately precede the behavior itself by (a) asking participants to specifically consider the period immediately preceding the attempt and (b) framing the time period in a manner that might spuriously influence respondents' answers (e.g., asking how many *minutes* were spent planning, thereby priming the individual to think only about a short time frame).

If a person already understands the consequences of engaging in a behavior and the steps required to engage in that behavior, he or she should not need to repeat this process immediately prior to the behavior for it to be considered planned and non-impulsive. For example, emergency surgeons spend countless hours developing expertise at specific components of particular surgical procedures and considering the contextual factors that could affect their decision to utilize one approach versus other options. Yet, when surgeons are involved in an actual emergency surgical procedure, their decisions often appear automatic, as if their decision to choose a particular option reflected a momentary, and perhaps impulsive, decision rather than the result of a deliberate process involving practice, prior experiences, and thoughtful planning. Here again, the clinical implications must be noted, as unplanned behaviors may not be preventable, but behaviors planned long before their enactment may well be.

Measurement Issues in Studies Examining Impulsiveness of Specific Suicide Attempts

The inconsistent operationalizations of impulsive attempts indicate a potential problem in the measurement of the construct. Therefore, we turn our attention to ways in which the impulsiveness of attempts is measured. The Planning subscale of Beck's Suicide Intent Scale (SIS; Beck, 1990; Beck, Schuyler, & Herman, 1974) is the most commonly used measure for the assessment of impulsiveness of attempts; however, there is little consistency in the number and selection of items to be used. Whereas some work has used only a single item from the measure, other permutations utilized include 2-, 3-, 7-, and 8-item versions (e.g., Brown et al., 1991; O'Donnell et al., 1996; Verkes et al., 1998; Weyrauch, Roy-Byrne, Katon, & Wilson, 2001; Wong & Phillips, 2009; see Table 2 for a summary). Furthermore, not all studies using 8-item versions of the SIS utilize the same items (e.g., Baca-Garcia et al., 2005; Mann & Malone, 1997). To our knowledge, no studies have been conducted comparing scores on this measure of planning to other such measures, thereby leaving the validity of the subscale without empirical support. Indeed, the lack of other established measures of this construct represents a significant obstacle in suicide research.

The shortcomings of the SIS in the assessment of impulsivity of attempts are not limited to inconsistency in item selection. The content of some of the items calls into question the validity of the measure in the assessment of the impulsivity of attempts. For instance, an item assessing the degree to which individuals who attempt suicide do so in isolation from others is often included in the SIS Planning subscale, with less isolation conceptualized as indicating greater impulsivity. This item seems problematic because many highly lethal methods (e.g., jumping from high places) often involve attempting suicide near other people and, if an individual decides that a particular public space (e.g., the Golden Gate Bridge) offers the greatest chance at death and plans extensively to utilize that location, the public nature of the event does not seem relevant to the planning that went into the action itself.

Another item utilized in various forms of the Planning subscale of the SIS assesses the degree to which an individual who attempts suicide makes an effort to get help during or after the attempt, with greater help-seeking behavior conceptualized as indicating greater impulsiveness of attempt. Here again, the relevance of this item to the impulsivity of the attempt is unclear. In fact, an argument could be made that, in this scenario, the only impulsive activity is the effort to contact others and preserve life in the face of imminent death. In other words, if an individual thoroughly plans an attempt, enacts the planned method, but feels a rush of fear during or immediately after this process (and this sequence of events does occur regularly), prompting an effort to obtain life-saving assistance, the attempt itself would not be impulsive. Instead, the person's efforts to preserve his or her life would constitute the only impulsive action because this behavior had not been planned—an ironic possibility indicating that "whims to live" may exist whereas "whims to die" do not. The possibility that individuals who make well-planned high-lethality attempts lament their decision and "flinch" is supported by the stories of survivors who jump from the Golden Gate Bridge, who have reported that immediately after jumping, they felt a deep sense of regret regarding their actions but were obviously incapable of reversing their decision or contacting help (Bourke, Shapiro, Steel, & Wolfson, 2006).

Other items included in various forms of the Planning subscale assess whether individuals left a suicide note, took specific actions in anticipation of their death, or communicated to others about their desire to attempt suicide. Each of these items has significant problems with respect to the measurement of impulsivity as well. With respect to suicide notes, research has indicated that only 20% to 35% of suicide decedents leave notes (e.g., Shioiri et al., 2005). Assuming that a lack of a note indicates impulsivity is problematic because it increases the odds of an attempt being considered impulsive by requiring that a relatively rare behavior (note-leaving) occur for an attempt to be considered non-impulsive. With respect to taking preparatory actions, the item itself focuses purely on interpersonal actions (e.g., making changes to will, taking out insurance) that may not be relevant to some individuals (e.g., individuals without a will or the assets or the legal representation needed to develop one). Furthermore, the item overlooks the fact that individuals attempting suicide typically feel isolated from others and thus may be disinclined to take actions directly related to other people's well-being (although the construct of perceived burdensomeness entails a belief that the individual's death will be worth more than his or her life, implying an effort to help others through lethal self-harm; Joiner, 2005). With respect to overt communication, it is simply unclear conceptually how an individual's decision to discuss a thought with another person reflects the degree to which that thought has been developed over time and considered within the context of its short- and long-term affects on the world. Of course, overt communication days prior to an attempt would clearly indicate significant forethought and thus would contradict the notion of an impulsive attempt. Tellingly, Robins (1981) found that 70% of suicide decedents engaged in such communications in the days before their death, usually more than once.

Perhaps the most important limitation to the items in the various forms of the Planning subscale of the SIS is the item that most directly overlaps with other measures used to assess impulsiveness of attempts. Specifically, one item asks how much time was spent considering attempting suicide prior to the attempt, with the available answers being "impulsive; no premeditation," "considered for <1 hr," "considered for <1 day," and "considered for >1 day." Two primary issues render this item less valuable than it may first appear. First,

the response scale appears to exclude the possibility that an individual extensively considered and planned an attempt long before engaging in the behavior but did not think about it extensively immediately preceding the attempt. For instance, if an individual plans a suicide attempt with great detail during an episode of elevated suicide risk, recovers from that episode with or without attempting, and then attempts suicide in the early portion of a later episode in a manner entirely consistent with the earlier plan, would this be impulsive or simply reflect the enaction of a well thought-out plan? Second, by framing the answers such that three of the four response options involve less than 24 hr, the measure may push respondents to think about premeditation as something that happens only during the moments immediately preceding the behavior. This framework does not offer the possibility that premeditation follows an episodic course, increasing and decreasing (or even ceasing entirely) across different periods of time but still building on itself with each progressive episode of contemplation. Importantly, some studies (e.g., O'Donnell et al., 1996) have provided an even shorter time frame with this item, with answers restricted to 0 ("none"), 1 ("less than 3 hr"), and 2 ("more than 3 hr"), further priming individuals to conceptualize planning as something that occurs only in the moments directly leading up to an attempt (another ironic possibility, as non-impulsive attempts would thus still be considered events that were borne of minimal forethought).

Proposed Alternative Model of the Relationship Between Impulsivity and Suicidal Behavior

Trait Impulsivity

In contrast to models that conceptualize suicidal behavior as frequently impulsive and that view the relationship between trait impulsivity and suicidal behavior as direct (Figure 1a), we propose that trait impulsivity is best regarded as one of many distal risk factors for suicidal behavior (see Figure 1b). This proposition is presented through the lens of the interpersonal-psychological theory of suicidal behavior (IPTS; Joiner, 2005). The IPTS proposes that, in addition to desiring death by suicide and/or non-lethal suicidal behavior, an individual must acquire the capability for suicide—defined as habituation both to physiological pain and to the fear of death—through repeated exposure to painful and provocative events before he or she can engage in lethal or near-lethal suicidal behavior. In this sense, the capacity to engage in suicidal behavior does not typically develop rapidly but rather reflects a series of encounters with experiences that alter an individual's response to pain and impending death, with repeated exposures resulting in a dampening of the initial fear response (see A. R. Smith et al., 2012 for evidence that heritability of the acquired capability is approximately 65%).

Initial support for the construct validity of the acquired capability for suicide was reported in studies that did not directly consider the IPTS model. In a series of studies comparing the pain tolerance of individuals who were hospitalized in response to a suicide attempt and individuals admitted to the same emergency room due to accidental injury, Orbach and colleagues (1996) and Orbach, Mikulincer, King, Cohen, and Stein (1997) reported that attempters exhibited higher pain tolerance than did individuals admitted due to accidental injury and that individuals with multiple suicide attempts exhibited greater pain tolerance than did individuals with zero or one prior attempt. Such findings are consistent with the notion that intentionally inflicting harm on oneself has a greater impact on pain tolerance than does accidental injury (thereby providing initial support for the notion that individuals can gradually overcome the fear of discomfort and death through deliberate practice) and that a longer history of self-inflicted injury is more robustly related to increased pain tolerance (providing initial support for the notion that this process unfolds through habituation). Similarly, Nock and Prinstein (2005) reported that increased frequency of NSSI is associated with pain analgesia during NSSI episodes (evidence for habituation), and Nock et al. (2006) reported that pain analgesia during NSSI episodes is associated with a greater likelihood of having made a suicide attempt (evidence for the importance of pain tolerance in the capacity for suicidal behavior). None of these studies utilized longitudinal data demonstrating increases in pain tolerance following repeated engagement in painful and/or provocative experiences, leaving open the possibility that elevated levels of pain tolerance facilitate severe self-harming behaviors entirely different from any habituation process. As such, the research base on this point is not definitive.

Efforts to measure the acquired capability directly have centered on the Acquired Capability for Suicide Scale (ACSS; Bender, Gordon, Bresin, & Joiner, 2011). Using this measure, researchers have reported that men report higher mean levels of the acquired capability than do females and military personnel report higher mean levels of the acquired capability than do civilians (including civilians with multiple lifetime suicide attempts; Bryan, Morrow, Anestis, & Joiner, 2010; Van Orden, Witte, Gordon, Bender, & Joiner, 2008). Further supporting the construct validity of the acquired capability, men engage in significantly fewer non-lethal suicide attempts for every lethal attempt than do women, and military personnel engage in significantly fewer non-lethal suicide attempts for every lethal attempt than do civilians, even when considering attempts that do not involve self-inflicted gunshot wounds (Anestis & Bryan, 2013). Such findings indicate that certain individuals, potentially due to their life experiences (e.g., basic training, physical aggression, NSSI) in combination with a genetic predisposition toward greater pain tolerance and diminished fear, are more able to engage in lethal suicidal behavior than are others, who might need to repeatedly engage in low lethality means

before developing the capacity to implement a method more likely to result in death or to utilize a lower lethality means in a manner more likely to result in death.

Painful and provocative events represent a fairly broad range of encounters; however, not all impactful life experiences can be considered painful or provocative. Painful and provocative events are understood to involve the experience of physiological pain, bodily harm (or the threat of bodily harm), the threat of death, witnessing the injury or death of others (e.g., witnessing others injured in combat, working in an emergency room setting), or some combination of these factors (e.g., Joiner, 2005). Furthermore, some evidence suggests that mental rehearsal of painful and provocative events (e.g., Post-traumatic Stress Disorder [PTSD] re-experiencing symptoms, daydreaming about death) are associated with elevations in the acquired capability, providing preliminary support for the possibility that cognitions could affect an individual's capacity for lethal self-harm (e.g., Anestis, Tull, Bagge, & Gratz, 2012; Bryan & Anestis, 2011; Selby, Anestis, & Joiner, 2007). In this sense, the raw number of painful and provocative experiences might not explain the entirety of the acquired capability; however, studies examining the acquired capability have demonstrated that it is associated with a greater lifetime exposure to painful and provocative events, including previous suicide attempts and NSSI (e.g., P. N. Smith, Cukrowicz, Poindexter, Hobson, & Cohen, 2010; Van Orden et al., 2008). Furthermore, studies show that the relationship between suicidal desire and suicidal behavior is strongest among individuals with elevated acquired capability (e.g., Anestis & Joiner, 2011; Joiner et al., 2009), and multiple studies have demonstrated a robust and statistically significant association between lifetime number of suicide attempts and lifetime number of painful and provocative experiences (e.g., Van Orden et al., 2008). Here again, directionality is not definitive, as no study to date has demonstrated that the acquired capability increases over time in response to painful and provocative experiences; however, extant evidence is thus far consistent with the expectations of the theory.

The IPTS proposes that impulsive individuals become vulnerable to suicidal behavior over time due to the nature of the experiences they tend to encounter relative to the life experiences of non-impulsive individuals (Joiner, 2005). Furthermore, given empirical evidence that the relationship between trait impulsivity and suicidal behavior or death by suicide decreases with age (e.g., Dumais et al., 2005), empirical findings may be more supportive of this model than alternatives in that, over time, non-impulsive individuals could eventually accumulate enough painful and/or provocative experiences to acquire the capacity for suicide whereas, in younger individuals, a tendency toward impulsive behavior may be more important to encounter sufficient pain and/or provocation. In this context, at the ages at which impulsivity is highest (i.e., youth), rates of severe suicidal behavior (e.g., death) are low—a fact that is not consistent with a proximal, direct role of impulsivity in serious suicidal behavior. Our alternative perspective points, rather, toward the cumulative effect of an impulsive lifestyle on suicide risk, noting that only youths who have experienced sufficiently painful and/or provocative events will have acquired sufficient capability for suicide to make a suicide attempt. In adults, on the other hand, the opportunities for non-impulsive individuals to engage in sufficient painful and/or provocative experiences will have increased over time, thereby leading to a decreased association between impulsivity and suicidal behavior.

Empirical Support for the Proposed Model

For a study to test the veracity of direct versus distal risk factor models adequately, a number of steps must be taken. With respect to trait impulsivity, mediation analyses must be utilized that consider not only the relationship between impulsivity and suicidal behavior but also the potential explanatory role of environmental experiences (e.g., painful and/or provocative experiences) in that relationship. Such data should be longitudinal to determine whether trait impulsivity prompts increases in painful and/or provocative experiences, which in turn predict future suicidal behavior. If impulsivity truly is a proximal risk factor for suicidal behavior, the cumulative experiences of an impulsive individual's life should not reduce the relationship between impulsivity and suicidal behavior to a negligible effect.

Research that tested the potential distal risk factor model of trait impulsivity as it relates to suicidal behavior has generally focused on the UPPS-P Impulsive Behavior Scale (UPPS-P; Cyders et al., 2007; Whiteside & Lynam, 2001). For instance, in a sample comprised of 2,011 U.S. military personnel, 1,296 undergraduates, and 399 high school students, Klonsky and May (2010) reported that negative urgency (the tendency to act rashly in an effort to reduce the intensity of negative affect; d = .41) and lack of premeditation (the tendency to act quickly without planning; d = .29) differentiated attempters from non-suicidal controls (ds = .09-.19 for lack of perseverance and sensation seeking). Between-group differences were of a smaller magnitude when comparing individuals with suicide attempts from individuals with ideation but no attempts (ds = −.05-.26). Furthermore, in a sample of nearly 500 patients in an outpatient community mental health clinic, Anestis and Joiner (2011) reported a four-way interaction of negative urgency and the three components of the IPTS (perceived burdensomeness, thwarted belongingness, acquired capability) in the prediction of lifetime number of suicide attempts, with the strength of the relationship between the IPTS constructs (elevated IPTS variables) and suicidal behavior increasing with negative urgency. Neither of these studies, however, utilized mediation analyses to test models that propose that suicidal behavior is frequently impulsive.

The relevance of this point is highlighted by further analyses of the data from Anestis and Joiner (2011), which revealed

that the positive associations between negative urgency and both the acquired capability and lifetime number of suicide attempts were mediated by participants' lifetime number of painful and/or provocative experiences (Anestis, Fink, et al., 2012). Prior work has demonstrated a positive association between negative urgency and desire for death but a negative association between negative urgency and the acquired capability (as measured through the ACSS and behaviorally indexed pain tolerance) in non-clinical samples (Anestis, Bagge, Tull, & Joiner, 2011). In other words, individuals with elevated levels of negative urgency appear, on average, to exhibit higher desire for death but may be less capable of acting on such desire due to an inability to tolerate the physiological and emotional discomfort associated with suicidal behavior. These follow-up analyses thus appear to offer an element of clarity: In clinical samples, people with higher negative urgency may be at risk for suicidal behavior not because of their impulsivity but rather because of the types of behaviors that impulsive individuals in clinical samples tend to engage in over time. In other words, in non-clinical samples, individuals with elevated negative urgency might engage in dysregulated and unhealthy behaviors that are neither painful nor provocative in a manner likely to directly affect their acquired capability (e.g., binge eating, impulsive shopping). In clinical samples, however, individuals with higher negative urgency might be at greater risk for engaging in painful and/or provocative behaviors (e.g., NSSI, physical aggression) that tend to result in elevations in the acquired capability. The difference between non-clinical and clinical samples would thus be the behaviors engaged in by impulsive individuals, not impulsivity itself, with the behaviors utilized by individuals in clinical samples more likely to result in enhanced pain tolerance and a reduced fear of death and bodily harm. Such findings directly support our proposed alternative model and are buffered by the findings of Bender et al. (2011), who also found that painful and provocative events mediated the relationship between impulsivity (BIS and UPPS) and acquired capability. In each case, bootstrapping analyses supported full mediation.

An important consideration, however, is that in each case, the mediation analyses were cross-sectional. As such, assumptions about temporal relationships and causal influences extend beyond the scope of the data. In this sense, although such findings represent substantial obstacles for models arguing a direct role for trait impulsivity in suicidal behavior, they provide only preliminary support for this alternative view of the nature of suicidal behavior. An alternative interpretation might be that some individuals are innately more capable of suicidal behavior and that both suicide attempts and other dysregulated behaviors stem from the same fearlessness and pain tolerance. Although this interpretation does not emphasize the need for the capability to be developed over time, it remains in line with the notion that suicidal behavior is fear-provoking and involves either pain or the threat of severe bodily harm. As such, the possibility that suicidal behavior is distinct from behaviors engaged in after a suddenly emerging thought or emotion (e.g., NSSI) remains plausible and the centrality of impulsivity in suicidal behavior remains in question.

Proposed Model of Impulsiveness of Specific Suicide Attempts

We believe that people are motivated to preserve life and that the will to live does not exist alongside an impulse for death. Furthermore, we believe that individuals who develop suicidal desire contemplate, plan, and then eventually engage in suicidal behavior as a culmination of a process that requires planning and resolve and does not reflect a sudden, unforeseeable, emotion-laden impulse. Although the degree of planning varies across cases, we believe the floor of this range is higher than that considered in models that conceptualize suicidal behavior as impulsive and that the occurrence of attempts in the absence of substantial planning remains far below that predicted by such models. Furthermore, although the amount of time that elapses between a decision to enact self-harm and the actual behavior may be brief, the behavior is not necessarily impulsive as significant thought about suicide likely occurred in the hours, days, and weeks prior to the final decision. The fear and discomfort associated with suicide attempts require individuals to experience at least a momentary increase in negative affect and physiological discomfort to obtain a goal (death). Given that, for many individuals who are motivated to attempt suicide, a primary motivation for impulsive behaviors is an immediate escape from negative affect (e.g., Nock & Prinstein, 2005), suicidal behavior appears to require not only a delay in obtaining that outcome but in fact a momentary increase in the experience (negative affect) that the individual seeks to avoid.

We suggest that impulsive individuals engage in suicidal behavior at an elevated rate but that they do not do so impulsively. The nature of suicide is inconsistent with the motives that drive many of their impulsive actions, and the fear associated with facing imminent death serves as too great of an obstacle for an individual to overcome without significant thought and planning. One measure was recently developed in an effort to assess episodic planning of suicidal behavior (Measure of Episodic Planning of Suicide [MEPOS]; Anestis, Pennings, & Williams, 2014). The scale asks how long an individual planned his or her most recent attempt (with thoughts of using the specific method ultimately chosen for that attempt), even if periods of time passed between thoughts. The authors reported that, in a sample of 50 individuals with at least one prior attempt, no individuals whose most recent attempt involved clear intent to die reported engaging in suicidal behavior without any planning. Furthermore, among the full sample, the average time spent planning was between several days and several weeks and, for individuals whose most recent attempt involved clear intent to die, the average time spent planning was between several weeks and several

months. Despite these promising early results, more work is needed to test this conceptualization of suicidal behavior. That being said, we believe that acknowledging this perspective as a viable alternative to current conceptualizations that emphasize impulsivity will lead to future studies better able to address current ambiguities.

Future Directions

As scientists move toward a better understanding of the relationship between impulsivity and suicide, a number of steps can be taken to enhance the insight provided by the research findings. First, with respect to trait impulsivity, although we have already noted that any examination of traits will be unable to evaluate models proposing that suicidal behavior is frequently impulsive, greater methodological rigor can nonetheless result in more stringent theory-driven tests likely to reduce the amount of inconsistency across studies. Specifically, researchers should include covariates that assess the degree to which the experiences typically encountered by impulsive individuals might account for any significant relationship. Such methodological rigor would allow for a clearer test of the degree to which impulsivity exhibits a direct relationship with suicidal behavior. In addition, the field would benefit from a clearer delineation of the role of planning in impulsive behavior. Indeed, we anticipate that some readers may disagree with our contention that planning is incompatible with impulsivity (or at least certain subcomponents of impulsivity). Greater conceptual clarity would thus afford a greater opportunity for consensus building with respect to the role of impulsivity in suicidal behavior.

Changes in how trait impulsivity is studied will not completely address the issues mentioned in this review. Indeed, we believe an emphasis on trait impulsivity would be unlikely to yield definitive results either way. The study of impulsivity of attempts also needs significant adjustments. Specifically, new measures and/or methodologies that are more sensitive to the possibility that planning occurs in a non-linear, episodic manner need to be developed and validated. Such measures should be capable of assessing whether people have considered suicidal behavior to any degree in the past and, if so, when those thoughts occurred, what those thoughts entailed, and what changed across time prior to engagement in an attempt (e.g., diminishing fear of death, increased tolerance of physiological pain). The development of such measures would uncover the course of risk and the path toward deciding to enact lethal self-harm.

In summary, the evidence for models positing that suicidal behavior is frequently impulsive is problematic. Indeed, the mean effect size for the relationship between trait impulsivity and suicidal behavior is small in magnitude. Furthermore, work purporting to measure impulsivity of attempts has yielded valuable clinical information, but methodological obstacles (e.g., failure to assess for episodic planning) have prevented such studies from accurately assessing the construct. Further work is needed to enhance confidence in our proposed model; however, we believe that an emerging line of research supports the view that people very rarely, or perhaps even never, attempt suicide without substantial forethought and planning.

Authors' Note

The views in this article are those of the authors and do not necessarily represent the official policy or position of the Department of Veterans Affairs, the Department of Defense, or the United States Government.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This material is the result of work supported with the resources of and the use of facilities at the Denver VA Medical Center; Veterans Integrated Service Network (VISN) 19 Mental Illness Research, Education, and Clinical Center (MIRECC); the Military Suicide Research Consortium (MSRC); and the Department of Defense. The MSRC is an effort supported by the Office of the Assistant Secretary of Defense for Health Affairs under Award Nos. W81XWH-10-2-0178 and W81XWH-10-2-0181.

Supplementary Material

The online supplementary appendix is available at http://psp.sagepub.com/supplemental.

Notes

1. We also ran additional meta-analyses in which (1) a grand mean effect was calculated for each effect and (2) multiple effects were all entered separately from the same sample. In each case, results mirrored the findings of our meta-analysis examining only a single representative effect from each sample (Hedges g = .31-.34).
2. To ensure that results were not spuriously impacted by differences in the constructs assessed in self-report versus behavioral measures of impulsivity, we ran an additional set of exploratory meta-analyses in which (1) only a single self-report effect was considered within each sample or (2) only a single behavioral effect was measured within each sample. Results from both samples indicated small effect sizes (Hedges g = .33, k = 71 for self-report; Hedges g = .40, k = 6 for behavioral measures). These results slightly favor behavioral measures; however, the small number of samples with behavioral data renders such results difficult to interpret.
3. To examine whether the strength of the relationship between trait impulsivity and suicidal behavior is dependent on other variables, we ran a series of exploratory analyses examining sex, age, and assessment type as potential moderators. Results from meta-regressions indicated that neither age (z = −1.01;

$p = .31$) nor the percentage of the sample that is male ($z = -.01$; $p = .98$) affects the strength of the relationship between trait impulsivity and suicidal behavior. Similarly, analyses considering measurement type (self-report vs. other) revealed no significant moderation effect.

References

References marked with an asterisk indicate studies utilized in meta-analysis but not referenced within the text.

*An, J., Phillips, M. R., & Conner, K. R. (2010). Validity of proxy-based reports of impulsivity and aggression in Chinese research on suicidal behavior. *Crisis: The Journal of Crisis Intervention and Suicide Prevention*, *31*, 137-142. doi:10.1027/0227-5910/a000019

Anestis, M. D., Bagge, C. L., Tull, M. T., & Joiner, T. E. (2011). Clarifying the role of emotion dysregulation in the interpersonal-psychological theory of suicidal behavior in an undergraduate sample. *Journal of Psychiatric Research*, *45*, 603-611. doi:10.1016/j.jpsychires.2010.10.013

Anestis, M. D., & Bryan, C. J. (2013). Means and capacity for suicidal behavior: A comparison of the ratio of suicide attempts and deaths by suicide in the US military and general population. *Journal of Affective Disorders*, *148*, 42-47.

Anestis, M. D., Fink, E. L., Bender, T. W., Selby, E. A., Smith, A. R., Witte, T. K., & Joiner, T. E. (2012). Re-considering the association between negative urgency and suicidality. *Personality and Mental Health*, *6*, 138-146. doi:10.1002/pmh.178

Anestis, M. D., & Joiner, T. E. (2011). Examining the role of emotion in suicidality: Negative urgency as an amplifier of the relationship between components of the interpersonal-psychological theory of suicidal behavior and lifetime number of suicide attempts. *Journal of Affective Disorders*, *129*, 216-269. doi:10.1016/j.jad.2010.08.006

Anestis, M. D., Pennings, S. M., & Williams, T. J. (2014). Preliminary results from an examination of episodic planning in suicidal behavior. *Crisis: The Journal of Crisis Intervention and Suicide Prevention*, *35*, 186-192.

Anestis, M. D., Tull, M. T., Bagge, C. L., & Gratz, K. L. (2012). The moderating role of distress tolerance in the relationship between posttraumatic stress disorder symptom clusters and suicidal behavior among trauma-exposed substance users in residential treatment. *Archives of Suicide Research*, *16*, 198-211.

Baca-Garcia, E., Diaz-Sastre, C., Basurte, E., Prieto, R., Ceverino, A., Saiz-Ruiz, J., & de Leon, J. (2001). A prospective study of the paradoxical relationship between impulsivity and lethality of suicide attempts. *Journal of Clinical Psychiatry*, *62*, 560-564. doi:10.4088/JCP.v62n07a11

Baca-Garcia, E., Diaz-Sastre, C., Resa, E. G., Blasco, H., Conesa, D. B., Oquendo, M. A., . . . de Leon, J. (2005). Suicide attempts and impulsivity. *European Archives of Psychiatry & Clinical Neuroscience*, *255*, 152-156. doi:10.1007/s00406-004-0549-3

*Bagge, C. L., Glenn, C. R., & Lee, H.-J. (2013). Quantifying the impact of recent negative life events on suicide attempts. *Journal of Abnormal Psychology*, *122*, 359-368. doi:10.1037/a0030371

Bagge, C. L., & Sher, K. J. (2008). Adolescent alcohol involvement and suicide attempts: Toward the development of a conceptual framework. *Clinical Psychology Review*, *28*, 1283-1296. doi:10.1016/j.cpr.2008.06.002

Barratt, E. S. (1993). Impulsivity: Integrating cognitive, behavioral, biological, and environmental data. In W. McCowan, J. Johnson, & M. Shure (Eds.), *The impulsive client: Theory, research, and treatment* (pp. 39-56). Washington, DC: American Psychological Association.

Baumeister, R. F. (1990). Suicide as escape from self. *Psychological Review*, *97*, 90-113.

*Beautrais, A. L. (2004). Further suicidal behavior among medically serious suicide attempters. *Suicide and Life-Threatening Behavior*, *34*, 1-11. doi:10.1521/suli.34.1.1.27772

*Beautrais, A. L., Joyce, P. R., & Mulder, R. T. (1999). Personality traits and cognitive styles as risk factors for serious suicide attempts among young people. *Suicide & Life-Threatening Behavior*, *29*, 37-47. doi:10.1111/j.1943-278X.1999.tb00761.x

*Bechara, A., Damasio, A. R., Damasio, H., & Anderson, S. W. (1994). Insensitivity to future consequences following damage to human prefrontal cortex. *Cognition*, *50*, 7-15. doi:10.1016/0010-0277(94)90018-3

Beck, A. T. (1990). Suicide intent scale (for attempters). In S. J. Blumenthal & D. J. Kupfer (Eds.), *Suicide over the life cycle: Risk factors, assessment, and treatment of suicidal patients* (pp. 769-773). Washington, DC: American Psychiatric Press.

Beck, A. T., Schuyler, D., & Herman, I. (1974). Development of suicidal intent scales. In A. T. Beck (Ed.), *The prediction of suicide* (pp. 45-56). Philadelphia, PA: Charles Press.

Beck, A. T., Steer, R. A., Kovacs, M., & Garrison, B. (1985). Hopelessness and eventual suicide: A 10-year prospective study of patients hospitalized with suicidal ideation. *American Journal of Psychiatry*, *142*, 559-563.

*Bender, T. W., Anestis, M. D., Anestis, J. C., Gordon, K. H., & Joiner, T. E. (2012). Affective and behavioral paths towards the acquired capability for suicide. *Journal of Social & Clinical Psychology*, *31*, 81-100. doi:10/1521/jscp.2012.31.1.81

Bender, T. W., Gordon, K. H., Bresin, K., & Joiner, T. E., Jr. (2011). Impulsivity and suicidality: The mediating role of painful and provocative experiences. *Journal of Affective Disorders*, *129*, 301-307. doi:10.1016/j.jad.2010.07.023

Bickel, W. K., & Marsch, L. A. (2001). Toward a behavioral economic understanding of drug dependence: Delay discounting processes. *Addiction*, *96*, 73-86.

Borenstein, R., Hedges, L., Higgins, J., & Rothstein, H. (2005). *Comprehensive meta-analysis* (Version 2). Englewood, NJ: Biostat.

Bostwick, J. M., & Pankratz, V. S. (2000). Affective disorders and suicide risk: A reexamination. *American Journal of Psychiatry*, *157*, 1925-1932. doi:10.1176/appi.ajp.157.12.1925

Bourke, A. P., Shapiro, E., Steel, E., & Wolfson, J. (Producer), & Steel, E. (Director). (2006). *The bridge* (DVD). New York, NY: Koch Lorber Films.

*Brent, D. A., Greenhill, L. L., Compton, S., Emslie, G., Wells, K., Walkup, J. T., . . . Turner, J. B. (2009). The treatment of Adolescent Suicide Attempters Study (TASA): Predictors of suicidal events in an open treatment trial. *Journal of the American Academy of Child & Adolescent Psychiatry*, *48*, 987-996. doi:10.1097/CHI.0b013e3181b5dbe4

*Brent, D. A., Oquendo, M., Birmaher, B., Greenhill, L., Kolko, D., Stanley, B., . . . Mann, J. J. (2003). Peripubertal suicide attempts in offspring of suicide attempters with siblings con-

cordant for suicidal behavior. *American Journal of Psychiatry*, *160*, 1486-1493. doi:10.1176/appi.ajp.160.8.1486

*Brezo, J., Paris, J., Tremblay, R., Vitaro, F., Hebert, M., & Turecki, G. (2007). Identifying correlates of suicide attempts in suicidal ideators: A population-based study. *Psychological Medicine*, *37*, 1551-1562. doi:10.1017/S0033291707000803

*Brodsky, B. S., Malone, K. M., Ellis, S. P., Dulit, R. A., & Mann, J. J. (1997). Characteristics of borderline personality disorder associated with suicidal behavior. *American Journal of Psychiatry*, *154*, 1715-1719.

*Broos, N., Schmaal, L., Wiskerke, J., Kostelijk, L., Lam, T., Stoop, N., . . . Goudriaan, A. E. (2012). The relationship between impulsive choice and impulsive action: A cross-species translational study. *PLoS ONE*, *7*, e36781. doi:10.1371/journal.pone.0036781

Brown, L. K., Overholser, J., Spirito, A., & Fritz, G. K. (1991). The correlates of planning in adolescent suicide attempts. *Journal of the American Academy of Child & Adolescent Psychiatry*, *30*, 95-99. doi:10.1097/00004583-199101000-00014

Bryan, C. J., & Anestis, M. D. (2011). Re-experiencing symptoms and the interpersonal-psychological theory of suicidal behavior among deployed service members evaluated for traumatic brain injury. *Journal of Clinical Psychology*, *67*, 856-864.

Bryan, C. J., Morrow, C. E., Anestis, M. D., & Joiner, T. E. (2010). A preliminary test of the interpersonal-psychological theory of suicidal behavior in a military sample. *Personality and Individual Differences*, *48*, 47-50.

*Buelow, M. T., & Suhr, J. A. (2009). Construct validity of the Iowa Gambling Task. *Neuropsychology Review*, *19*, 102-114. doi:10.1007/s11065-009-9083-4

*Bulik, C. M., Thornton, L., Pinheiro, A. P., Plotnicov, K., Klump, K. L., Brandt, H., . . . Kaye, W. H. (2008). Suicide attempts in anorexia nervosa. *Psychosomatic Medicine*, *70*, 378-383. doi:10.1097/PSY.0b013e3181646765

*Carli, V., Jovanovic, N., Podlesek, A., Roy, A., Rihmer, Z., Maggi, S., . . . Sarchiapone, M. (2010). The role of impulsivity in self-mutilators, suicide ideators and suicide attempters—A study of 1265 male incarcerated individuals. *Journal of Affective Disorders*, *123*, 116-122. doi:10.1016/j.jad.2010.02.119

*Chen, E. Y. H., Chan, W. S. C., Chan, S. S. M., Liu, K. Y., Chan, C. L. W., Wong, P. W. C., . . . Yip, P. S. (2007). A cluster analysis of the circumstances of death in suicide in Hong Kong. *Suicide and Life-Threatening Behavior*, *37*, 576-584. doi:10/1521/suli.2007.37.5.576

*Chesin, M. S., Jeglic, E. L., & Stanley, B. (2010). Pathways to high-lethality suicide attempts in individualswith borderline personality disorder. *Archives of Suicide Research*, *14*, 342-362. doi:10.1080/13811118.2010.524054

*Cloutier, P., Martin, J., Kennedy, A., Nixon, M. K., & Muehlenkamp, J. J. (2010). Characteristics and cooccurrence of adolescent non-suicidal self-injury and suicidal behaviors in pediatric emergency crisis services. *Journal of Youth Adolescence*, *39*, 259-269. doi:10.1007/s10964-009-9465-1

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.

*Collette, F., Van der Linden, M., Delifiore, G., Degueldre, C., Luxen, A., & Salmon, E. (2001). The functional anatomy of inhibition processes investigated with the Hayling task. *NeuroImage*, *14*, 258-267. doi:10.1006/nimg.2001.0846

Conner, K. R., Duberstein, P. R., Beckman, A., Heisel, M. J., Hirsch, J. K., Gamble, S., & Conwell, Y. (2007). Planning of suicide attempts among depressed inpatients ages 50 and over. *Journal of Affective Disorders*, *97*, 123-128. doi:10.1016/j.jad.2006.06.003

Connor, D. F., Glatt, S. J., Lopez, I. D., Jackson, D., & Melloni, R. H. (2002). Psychopharmacology and agression I: A meta-analysis of stimulant effects on overt/covert aggression-related behaviors in ADHD. *Journal of the American Academy of Child and Adolescent Psychiatry*, *41*, 253-261. doi:10.1097/00004583-200203000-00004

Conner, K. R., Hesselbrock, V. M., Schuckit, M. A., Hirsch, J. K., Knox, K. L., Meldrum, S., . . . Soyka, M. (2006). Precontemplated and impulsive suicide attempts among individuals with alcohol dependence. *Journal of Studies on Alcohol and Drugs*, *67*, 95-101.

*Conner, K. R., Phillips, M. R., Meldrum, S., Knox, K. L., Zhang, Y., & Yang, G. (2005). Low-planned suicides in China. *Psychological Medicine*, *35*, 1197-1204. doi:10.1017/S003329170500454X

Conwell, Y., Duberstein, P. R., Connor, K., Eberly, S., Cox, C., & Caine, E. D. (2002). Access to firearms and risk for suicide in middle-aged and older adults. *American Journal of Geriatric Psychiatry*, *10*, 407-416.

Cooper, H. (1998). *Synthesizing research: A guide for literature reviews* (3rd ed.). Beverly Hills, CA: SAGE.

*Corruble, E., Benyamina, A., Bayle, F., Falissard, B., & Hardy, P. (2003). Understanding impulsivity in severe depression? A psychometrical contribution. *Progress in Neuro-Psychopharmacology & Biological Psychiatry*, *27*, 829-833. doi:10.1016/S0278-5846(03)00115-5

*Corruble, E., Damy, C., & Guelfi, J. D. (1999). Impulsivity: A relevant dimension in depression regarding suicide attempts? *Journal of Affective Disorders*, *53*, 211-215. doi:10.1016/S0165-0327(98)00130-X

*Corruble, E., Hatem, N., Damy, C., Falissard, B., Guelfi, J., Reynaud, M., & Hardy, P. (2003). Defense styles, impulsivity and suicide attempts in major depression. *Psychopathology*, *36*, 279-284. doi:10.1159/000075185

*Costa, P., & McCrae, R. R. (1992). *NEO-PI-R Professional manual*. Odessa, FL: Psychological Assessment Resources.

*Courtet, P., Picot, M., Bellivier, F., Torres, S., Jollant, F., Michelon, C., . . . Malafosse, A. (2004). Serotonin transporter gene may be involved in short-term risk of subsequent suicide attempts. *Biological Psychiatry*, *55*, 46-51. doi:10.1016/j.biopsych.2003.07.004

Cyders, M. A., Smith, G. T., Spillane, N. S., Fischer, S., Annus, A. M., & Peterson, C. (2007). Integration of impulsivity and positive mood to predict risky behavior: Development and validation of a measure of positive urgency. *Psychological Assessment*, *19*, 107-118. doi:10.1037/1040-3590.19.1.107

Deisenhammer, E. A., Ing, C., Strauss, R., Kemmler, G., Hinterhuber, H., & Weiss, E. M. (2009). The duration of the suicidal process: How much time is left for intervention between consideration and accomplishment of a suicide attempt? *Journal of Clinical Psychiatry*, *70*, 19-24. doi:10.4088/JCP.07m03904

*de Lara, C. L., Brezo, J., Rouleau, G., Lesage, A., Dumont, M., Alda, M., . . . Turecki, G. (2007). Effect of tryptophan hydroxylase-2 gene variants on suicide risk in major

depression. *Biological Psychiatry*, *62*, 72-80. doi:10.1016/j.biopsych.2006.09.008

de Leo, D., Cerin, E., Spathonis, K., & Burgis, S. (2005). Lifetime risk of suicide ideation and attempts in an Australian community: Prevalence, suicidal process, and help-seeking behavior. *Journal of Affective Disorders*, *86*, 215-224. doi:10.1016/j.jad.2005.02.001

*de Oliveira, G. N., Kummer, A., Salgado, J. V., de Araujo Filho, G. M., David, A. S., & Teixeira, A. L. (2011). Suicidality in temporal lobe epilepsy: Measuring the weight of impulsivity and depression. *Epilepsy & Behavior*, *22*, 745-749. doi:10.1016/j.yebeh.2011.09.004

*Dervic, K., Oquendo, M. A., Grunebaum, M. F., Ellis, S., Burke, A. K., & Mann, J. J. (2004). Religious affiliation and suicide attempt. *American Journal of Psychiatry*, *161*, 2303-2308. doi:10.1176/appi.ajp.161.12.2303

*Dickman, S. J. (1990). Functional and dysfunctional impulsivity: Personality and cognitive correlates. *Journal of Personality and Social Psychology*, *58*, 95-102. doi:10.1037/0022-3514.58.1.95

*Dolan, M., & Fullam, R. (2004). Behavioural and psychometric measures of impulsivity in a personality disordered population. *The Journal of Forensic Psychiatry & Psychology*, *15*, 426-450. doi:10.1080/14789940410001721048

Dombrovski, A. Y., Szanto, K., Siegle, G. J., Wallace, M. L., Forman, S. D., Sahakian, B., . . . Clark, L. (2011). Lethal forethought: Delayed reward discounting differentiates high- and low-lethality suicide attempts in old age. *Biological Psychiatry*, *70*, 138-144. doi:10.1016/j.biopsych.2010.12.025

*Dougherty, D. M., Bjork, J. M., Harper, R. A., Marsh, D. M., Moeller, F. G., Mathias, C. W., & Swann, A. C. (2003). Behavioral impulsivity paradigms: A comparison in hospitalized adolescents with disruptive behavior disorders. *Journal of Child Psychology and Psychiatry*, *44*, 1145-1157. doi:10.1111/1469-7610.00197

*Dougherty, D. M., Bjork, J. M., Harper, R. A., Mathias, C. W., Moeller, F. G., & Marsh, D. M. (2003). Validation of the immediate and delayed memory tasks in hospitalized adolescents with disruptive behavior disorders. *The Psychological Record*, *53*, 509-532.

*Dougherty, D. M., Marsh, D. M., & Mathias, C. W. (2002). Immediate and delayed memory tasks: A computerized measure of memory, attention, and impulsivity. *Behavior Research Methods, Instruments, & Computers*, *34*, 391-398.

*Dougherty, D. M., Marsh-Richard, D. M., Hatzis, E. S., Nouvion, S. O., & Mathias, C. W. (2008). A test of alcohol dose effects on multiple behavioral measures of impulsivity. *Drug and Alcohol Dependence*, *96*, 111-120. doi:10.1016/j.drugalcdep.2008.02.002

*Dougherty, D. M., Mathias, C. W., & Marsh, D. M. (2003). *GoStop impulsivity paradigm* (Version 1.0) [Manual]. San Antonio: Neurobehavioral Research Laboratory and Clinic, University of Texas Health Science Center.

*Dougherty, D. M., Mathias, C. W., Marsh, D. M., & Papageorgiou, T. D. (2003). *Single Key Impulsivity Paradigm* (Version 1.0) [Manual]. Houston: Neurobehavioral Research Laboratory and Clinic, University of Texas Health Science Center at Houston.

Dougherty, D. M., Mathias, C. W., Marsh, D. M., Papageorgiou, T. D., Swann, A. C., & Moeller, F. G. (2004). Laboratory measured behavioral impulsivity relates to suicide attempt history. *Suicide and Life-Threatening Behavior*, *34*, 374-385. doi:10.1521/suli.34.4.374.53738

*Dougherty, D. M., Mathias, C. W., Marsh-Richard, D. M., Prevette, K. N., Dawes, M. A., Hatzis, E. S., . . . Nouvion, S. O. (2009). Impulsivity and clinical symptoms among adolescents with non-suicidal self-injury with or without attempted suicide. *Psychiatry Research*, *169*, 22-27. doi:10.1016/j.psychres.2008.06.011

*Dumais, A., Lesage, A. D., Alda, M., Rouleau, G., Dumont, M., Chawky, N., . . . Turecki, G. (2005). Risk factors for suicide completion in major depression: A case-control study of impulsive and aggressive behaviors in men. *American Journal of Psychiatry*, *162*, 2116-2124. doi:10.1176/appi.ajp.162.11.2116

*Ekinci, O., Albayrak, Y., & Caykoylu, A. (2011). Impulsivity in euthymic patients with major depressive disorder: The relation to sociodemographic and clinical properties. *The Journal of Nervous and Mental Disease*, *199*, 454-458. doi:10.1097/NMD.0b013e3182214116

*Ekinci, O., Albayrak, Y., Ekinci, A. E., & Caykoylu, A. (2011). Relationship of trait impulsivity with clinical presentation in euthymic bipolar disorder patients. *Psychiatry Research*, *190*, 259-264. doi:10.1016/j.psychres.2011.06.010

*Fazaa, N., & Page, S. (2011). Personality styles and impulsivity as determinants of suicidal subgroups. *Archives of Suicide Research*, *13*, 31-45. doi:10.1080/13811110802572122

*Fennig, S., Geva, K., Zalsman, G., Weizman, A., Fennig, S., & Apter, A. (2005). Effect of gender on suicide attempts versus nonattempters in an adolescent inpatient unit. *Comprehensive Psychiatry*, *46*, 90-97. doi:10.1016/j.comppsych.2004.07.037

*Forcano, L., Fernandez-Aranda, F., Alvarez-Moya, E., Bulik, C., Granero, R., Gratacos, M., . . . Estivill, X. (2009). Suicide attempts in bulimia nervosa: Personality and psychopathological correlates. *European Psychiatry*, *24*, 91-97. doi:10.1016/j.eurpsy.2008.10.002

*Gibbs, L. M., Dombrovski, A. Y., Morse, J., Siegle, G. J., Houck, P. R., & Szanto, K. (2009). When thesolution is part of the problem: Problem solving in elderly suicide attempters. *InternationalJournal of Geriatric Psychiatry*, *24*, 1396-1404. doi:10.1002/gps.2276

*Giegling, I., Hartmann, A. M., Moller, H., & Rujescu, D. (2006). Anger- and aggression-related traits are associated with polymorphisms in the 5-HT-2A gene. *Journal of Affective Disorders*, *96*, 75-81. doi:10.1016/j.jad.2006.05.016

Giegling, I., Olgiati, P., Hartmann, A. M., Calati, R., Moller, H., Rujescu, D., & Serretti, A. (2009). Personality and attempted suicide: Analysis of anger, aggression, and impulsivity. *Journal of Psychiatric Research*, *43*, 1262-1271. doi:10.1016/j.jpsychires.2009.04.013

*Giegling, I., Rujescu, D., Mandelli, L., Schneider, B., Hartmann, A., Schnabel, A., . . . Serretti, A. (2007). Tachykinin Receptor 1 variants associated with aggression in suicidal behavior. *American Journal of Medical Genetics Part B: Neuropsychiatric Genetics*, *144B*, 757-761. doi:10.1002/ajmg.b.30506

*Giegling, I., Rujescu, D., Mandelli, L., Schneider, B., Hartmann, A., Schnabel, A., . . . Serretti, A. (2008). Estrogen receptor gene 1 variants are not associated with suicidal behavior. *Psychiatry Research*, *160*, 1-7. doi:10.1016/j.psychres.2007.05.007

*Gilbert, A. M., Garno, J. L., Braga, R. J., Shaya, Y., Goldberg, T. E., Malhotra, A. K., & Burdick, K. E. (2011). Clinical and

cognitive correlates of suicide attempts in bipolar disorder: Is suicide predictable? *Journal of Clinical Psychiatry*, *72*, 1027-1033. doi:10.4088/JCP.10m06410

Gliner, J. A., Morgan, G. A., & Harmon, R. J. (2003). Meta-analysis: Formulation and interpretation. *Journal of the American Academy of Child & Adolescent Psychiatry*, *42*, 1376-1379. doi:10.1097/01.chi.0000085750.71002.01

*Greenberg, L. M., & Waldman, I. D. (1993). Developmental normative data on the Test of Variables of Attention (T.O.V.A.). *Journal of Child Psychology and Psychiatry*, *34*, 1019-1030. doi:10.1111/j.1469-7610.1993.tb01105.x

*Greening, L., Stoppelbein, L., Fite, P., Dhossche, D., Erath, S., Brown, J., . . . Young, L. (2008). Pathways to suicidal behaviors in childhood. *Suicide and Life-Threatening Behavior*, *38*, 35-45. doi:10.1521/suli.2008.38.1.35

*Grunebaum, M. F., Keilp, J., Li, S., Ellis, S. P., Burke, A. K., Oquendo, M. A., & Mann, J. J. (2005). Symptom components of standard depression scales and past suicidal behavior. *Journal of Affective Disorders*, *87*, 73-82. doi:10.1016/j.jad.2005.03.002

*Hall, R. C., Platt, D. E., & Hall, R. C. (1999). Suicide risk assessment: A review of risk factors for suicide in 100 patients who made severe suicide attempts. *Psychosomatics*, *40*, 18-27. doi:10.1016/S0033-3182(99)71267-3

*Hawton, K., Kingsbury, S., Steinhardt, K., James, A., & Fagg, J. (1999). Repetition of deliberate self-harm by adolescents: The role of psychological factors. *Journal of Adolescence*, *22*, 369-378. doi:10.1006/jado.1999.0228

*Hill, R. M., Pettit, J. W., Green, K. L., Morgan, S. T., & Schatte, D. J. (2012). Precipitating events in adolescent suicidal crises: Exploring stress-reactive and nonreactive risk profiles. *Suicide and Life-Threatening Behavior*, *42*, 11-21. doi:10.1111/j.1943-278X.2011.00067.x

*Horesh, N. (2001). Self-report vs. computerized measures of impulsivity as a correlate of suicidal behavior. *Crisis: The Journal of Crisis Intervention and Suicide Prevention*, *22*, 27-31. doi:10.1027//0027-5910.22.1.27

Houston, K., Hawton, K., & Sheppard, R. (2001). Suicide in young people aged 15-21: A psychological autopsy study. *Journal of Affective Disorders*, *63*, 159-170. doi:10.1016/S0165-0327(00)00175-0

*Huan, M., Hamazaki, K., Sun, Y., Itomura, M., Liu, H., Kang, W., . . . Hamazaki, T. (2004). Suicide attempt and n-3 fatty acid levels in red blood cells: A case control study in China. *Biological Psychiatry*, *56*, 490-496. doi:10.1016/j.biopsych.2004.06.028

*Javdani, S., Sadeh, N., & Verona, E. (2011). Suicidality as a function of impulsivity, callous-unemotional traits, and depressive symptoms in youth. *Journal of Abnormal Psychology*, *120*, 400-413. doi:10.1037/a0021805

Jeon, H. J., Lee, J.-Y., Lee, Y. M., Hong, J. P., Won, S.-H., Cho, S. J., . . . Cho, M. J. (2010). Unplanned versus planned suicide attempters, precipitants, methods, and an association with mental disorders in a Korea-based sample. *Journal of Affective Disorders*, *127*, 274-280. doi:10.1016/j.jad.2010.05.027

Jobes, D. A. (2006). *Managing suicidal risk: A collaborative approach*. New York, NY: Guilford Press.

Joiner, T. E. (2005). *Why people die by suicide*. Cambridge, MA: Harvard University Press.

Joiner, T. E. (2010). *Myths about suicide*. Cambridge, MA: Harvard University Press.

Joiner, T. E., Sachs-Ericsson, N. J., Wingate, L. R., Brown, J. S., Anestis, M. D., & Selby, E. A. (2007). Childhood physical and sexual abuse and lifetime number of suicide attempts: A persistent and theoretically important relationship. *Behaviour Research and Therapy*, *45*, 539-547. doi:10.1016/j.brat.2006.04.007

Joiner, T. E., Van Orden, K. A., Witte, T. K., Selby, E. A., Ribeiro, J., Lewis, R., & Rudd, M. D. (2009). Main predictions of the interpersonal-psychological theory of suicidal behavior: Empirical tests in two samples of young adults. *Journal of Abnormal Psychology*, *118*, 634-646. doi:10.1037/a0016500

*Kasen, S., Cohen, P., & Chen, H. (2011). Developmental course of impulsivity and capability from age 10 to age 25 as related to trajectory of suicide attempt in a community cohort. *Suicide and Life-Threatening Behavior*, *41*, 180-192. doi:10.1111/j.1943-278X.2011.00017.x

*Keilp, J. G., Gorlyn, M., Oquendo, M. A., Brodsky, B., Ellis, S. P., Stanley, B., & Mann, J. J. (2006). Aggressiveness, not impulsiveness or hostility, distinguishes suicide attempters with major depression. *Psychological Medicine*, *36*, 1779-1788. doi:10.1017.S0033291706008725

*Kingsbury, S., Hawton, K., Steinhardt, K., & James, A. (1999). Do adolescents who take overdoses have specific psychological characteristics? A comparative study with psychiatric and community controls. *Journal of the American Academy of Child & Adolescent Psychiatry*, *38*, 1125-1131. doi:10.1097/00004583-199909000-00016

Klonsky, E. D., & May, A. (2010). Rethinking impulsivity in suicide. *Suicide and Life-Threatening Behavior*, *40*, 612-619. doi:10.1521/suli.2010.40.6.612

*Langhinrichsen-Rohling, J., & Lamis, D. A. (2008). Current suicide proneness and past suicidal behavior in adjudicated adolescents. *Suicide and Life-Threatening Behavior*, *38*, 415-426. doi:10.1521/suli.2008.38.4.415

Large, M., Smith, G., Sharma, S., Nielssen, O., & Singh, S. P. (2011). Systematic review and meta-analysis of the clinical factors associated with the suicide of psychiatric in-patients. *Acta Psychiatrica Scandinavica*, *124*, 18-29.

*Lecrubier, Y., Braconnier, A., Said, S., & Payan, C. (1995). The Impulsivity Rating Scale (IRS): Preliminary results. *European Psychiatry*, *10*, 331-338. doi:10.1016/0924-9338(96)80333-6

*Lehnert, K. L., Overholser, J. C., & Spirito, A. (1994). Internalized and externalized anger in adolescent suicide attempters. *Journal of Adolescent Research*, *9*, 105-119. doi:10.1177/074355489491008

*Links, P., Nisenbaum, R., Ambreen, M., Balderson, K., Bergmans, Y., Eynan, R., . . . Cutcliffe, J. (2012). Prospective study of risk factors for increased suicide ideation and behavior following recent discharge. *General Hospital Psychiatry*, *34*, 88-97.

*Logan, G. D., Cowan, W. B., & Davis, K. A. (1984). On the ability to inhibit simple and choice reaction time responses: A model and a method. *Journal of Experimental Psychology: Human Perception and Performance*, *10*, 276-291. doi:10.1037/0096-1523.10.2.276

Lynam, D. R., & Miller, J. D. (2004). Personality pathways to impulsive behavior and their relations to deviance: Results from three samples. *Journal of Quantitative Criminology*, *20*, 319-341. doi:10.1007/s10940-0045867-0

*Lynam, D. R., Miller, J. D., Miller, D. J., Bornovalova, M. A., & Lejuez, C. W. (2011). Testing the relations between

impulsivity-related traits, suicidality, and nonsuicidal self-injury: A test of the incremental validity of the UPPS model. *Personality Disorders: Theory, Research, and Treatment*, *2*, 151-160. doi:10.1037/a0019978

*Malloy-Diniz, L., Fuentes, D., Borges Leite, W., Correa, H., & Bechara, A. (2007). Impulsive behavior in adults with attention deficit/hyperactivity disorder: Characterization of attentional, motor and cognitive impulsiveness. *Journal of the International Neuropsychological Society*, *13*, 693-698. doi:10.1017/S1355617707070889

*Mann, J. J., Bortinger, J., Oquendo, M. A., Currier, D., Li, S., & Brent, D. A. (2005). Family history of suicidal behavior and mood disorders in probands with mood disorders. *American Journal of Psychiatry*, *162*, 1672-1679. doi:10.1176/appi.ajp.162.9.1672

Mann, J. J., & Currier, D. (2009). Biological predictors of suicidal behavior in mood disorders. In D. Wasserman & C. Wasserman (Eds.), *Oxford textbook of suicide prevention: A global perspective* (pp. 335-341). Oxford, UK: Oxford University Press.

Mann, J. J., & Malone, K. M. (1997). Cerebrospinal fluid amines and higher-lethality suicide attempts in depressed inpatients. *Biological Psychiatry*, *41*, 162-171. doi:10.1016/S0006-3223(96)00217-X

*Mann, J. J., Malone, K. M., Sweeney, J. A., Brown, R. P., Linnoila, M., Stanley, B., & Stanley, M. (1996). Attempted suicide characteristics and cerebrospinal fluid amine metabolites in depressed inpatients. *Neuropsychopharmacology*, *15*, 576-586. doi:10.1016/S0893-133X(96)00102-9

*Mann, J. J., McBride, A., Brown, R. P., Linnoila, M., Leon, A. C., DeMeo, M., . . . Stanley, M. (1992). Relationship between central and peripheral serotonin indexes in depressed and suicidal psychiatric inpatients. *Archives of General Psychiatry*, *49*, 442-446. doi:10.1001/archpsyc.1992.01820060022003

Mann, J. J., Waternaux, C., Haas, G. L., & Malone, K. M. (1999). Toward a clinical model of suicidal behavior in psychiatric patients. *American Journal of Psychiatry*, *156*, 181-189.

*Maser, J. D., Akiskal, H. S., Schettler, P., Scheftner, W., Mueller, T., Endicott, J., . . . Clayton, P. (2002). Can temperament identify affectively ill patients who engage in lethal or near-lethal suicidal behavior? A 14-year prospective study. *Suicide and Life-Threatening Behavior*, *32*, 10-32. doi:10.1521/suli.32.1.10.22183

*Mathias, C. W., Dougherty, D. M., James, L. M., Richard, D. M., Dawes, M. A., Acheson, A., & Hill-Kapturczak, N. (2011). Intolerance to delayed reward in girls with multiple suicide attempts. *Suicide and Life-Threatening Behavior*, *41*, 277-286. doi:10.1111/j.1943-278X.2011.00027.x

*Matsuo, K., Nicoletti, M. A., Peluso, M. A. M., Hatch, J. P., Nemoto, K., . . . Soares, J. C. (2009). Anterior cingulate volumes associated with trait impulsivity in individuals with bipolar disorder. *Bipolar Disorders*, *11*, 628-636. doi:10.1111/j.1399-5618.2009.00732.x

*McGirr, A., Alda, M., Seguin, M., Cabot, S., Lesage, A., & Turecki, G. (2009). Familial aggregation of suicide explained by Cluster B traits: A three-group family study of suicide controlling for major depressive disorder. *American Journal of Psychiatry*, *166*, 1124-1134. doi:10.1176/appi.ajp.2009.08111744

*McGirr, A., Paris, J., Lesage, A., Renaud, J., & Turecki, G. (2007). Risk factors for suicide completion in borderline personality disorder: A case-controlled study of cluster B comorbidity and impulsive aggression. *Journal of Clinical Psychiatry*, *68*, 721-729.

*McGirr, A., Renaud, J., Bureau, A., Seguin, M., Lesage, A., & Turecki, G. (2008). Impulsive-aggressive behaviours and completed suicide across the life cycle: A predisposition for younger age of suicide. *Psychological Medicine*, *38*, 407-417. doi:10.1017/S0033291707001419

*McGirr, A., Sequin, M., Renaud, J., Benkelfat, C., Alda, M., & Turecki, G. (2006). Gender and risk factors for suicide: Evidence for heterogeneity in predisposing mechanisms in a psychological autopsy study. *Journal of Clinical Psychiatry*, *67*, 1612-1617.

*McGirr, A., Tousignant, M., Routhier, D., Pouliot, L., Chawky, N., Margolese, H. C., & Turecki, G. (2006). Risk factors for completed suicide in schizophrenia and other chronic psychotic disorders: A case-control study. *Schizophrenia Research*, *84*, 132-143. doi:10.1016/j.schres.2006.02.025

*Melhem, N. M., Brent, D. A., Ziegler, M., Iyengar, S., Kolko, D., Oquendo, M., . . . Mann, J. J. (2007). Familial pathways to early-onset suicidal behavior: Familial and individual antecedents of suicidal behavior. *American Journal of Psychiatry*, *164*, 1364-1370. doi:10.1176/appi.ajp.2007.06091522

Miranda, R., Scott, M., Hicks, R., Wilcox, H. C., Munfakh, J. L. H., & Shaffer, D. (2008). Suicide attempt characteristics, diagnoses, and future attempts: Comparing multiple attempters to single attempters and ideators. *Journal of the American Academy of Child & Adolescent Psychiatry*, *47*, 32-40. doi:10.1097/chi.0b013e31815a56cb

*Monnin, J., Thiemard, E., Vandel, P., Nicolier, M., Tio, G., Courtet, P., . . . Haffen, E. (2012). Sociodemographic and psychopathological risk factors in repeated suicide attempts: Gender differences in a prospective study. *Journal of Affective Disorders*, *136*, 35-43. doi:10.1016/j.jad.2011.09.001

Nakagawa, A., Grunebaum, M. F., Oquendo, M. A., Burke, A. K., Kashima, H., & Mann, J. J. (2009). Clinical correlates of planned, more lethal suicide attempts in major depressive disorder. *Journal of Affective Disorders*, *112*, 237-242. doi:10.1016/j.jad.2008.03.021

National Institute of Mental Health. (2008). *Suicide in the US: Statistics and Prevention*. Retrieved from http://www.lb7.uscourts.gov/documents/08-42261.pdf

*Nock, M. K., Borges, G., Bromet, E. J., Alonso, J., Angermeyer, M., Beautrais, A., . . . Williams, D. (2008). Cross-national prevalence and risk factors for suicidal ideation, plans, and attempts. *The British Journal of Psychiatry*, *192*, 98-105. doi:10.1192/bjp.bp.107.040113

Nock, M. K., Joiner, T. E., Gordon, K. H., Lloyd-Richardson, E., & Prinstein, M. (2006). Non-suicidal self-injury among adolescents: Diagnostic correlates and relation to suicide attempts. *Psychiatry Research*, *144*, 65-72. doi:10.1016/j.psychres.2006.05.010

Nock, M. K., & Prinstein, M. J. (2005). Clinical features and behavioral functions of adolescent self-mutilation. *Journal of Abnormal Psychology*, *114*, 140-146. doi:10.1037/0021-843X.114.1.140

O'Donnell, I., Farmer, R., & Catalan, J. (1996). Explaining suicide: The views of survivors of serious suicide attempts. *British Journal of Psychiatry*, *168*, 780-786. doi:10.1192/bjp.168.6.780

*Oquendo, M. A., Bongiovi-Garcia, M. E., Galfalvy, H., Goldberg, P. H., Grunebaum, M. F., Burke, A. K., & Mann, J. J. (2007). Sex differences in clinical predictors of suicidal acts after major depression: A prospective study. *American Journal of Psychiatry*, *164*, 134-141.

*Oquendo, M. A., Brent, D. A., Birmaher, B., Greenhill, L., Kolko, D., Stanley, B., . . . Mann, J. J. (2005). Posttraumatic stress disorder comorbid with major depression: Factors mediating the association with suicidal behavior. *American Journal of Psychiatry*, *162*, 560-566. doi:10.1176/appi.ajp.162.3.560

*Oquendo, M. A., Galfalvy, H., Russo, S., Ellis, S. P., Grunebaum, M. F., Burke, A., & Mann, J. J. (2004). Prospective study of clinical predictors of suicidal acts after a major depressive episode in patients with major depressive disorder or bipolar disorder. *American Journal of Psychiatry*, *161*, 1433-1441. doi:10.1176/appi.ajp.161.8.1433

*Oquendo, M. A., Waternaux, C., Brodsky, B., Parsons, B., Haas, G. L., Malone, K. M., & Mann, J. J. (2000). Suicidal behavior in bipolar mood disorder: Clinical characteristics of attempters and nonattempters. *Journal of Affective Disorders*, *59*, 107-117. doi:10.1016/S0165-0327(99)00129-9

Orbach, I., Mikulincer, M., King, R., Cohen, D., & Stein, D. (1997). Thresholds and tolerance of physical pain in suicidal and nonsuicidal adolescents. *Journal of Consulting and Clinical Psychology*, *65*, 646-652.

Orbach, I., Stein, D., Palgi, Y., Asherov, J., Har-Even, D., & Elizur, A. (1996). Perception of physical pain in accident and suicide attempt patients: Self-preservation vs self-desctruction. *Journal of Psychiatric Research*, *30*, 307-320.

Panagioti, M., Gooding, P. A., & Tarrier, N. (2012). A meta-analysis of the association between posttraumatic stress disorder and suicidality: The role of comorbid depression. *Comprehensive Psychiatry*, *53*, 915-930.

*Parmentier, C., Etain, B., Yon, L., Misson, H., Mathieu, F., Lajnef, M., . . . Bellivier, F. (2012). Clinical and dimensional characteristics of euthymic bipolar patients with or without suicidal behavior. *European Psychiatry*, *27*, 570-576. doi:10.1016/j.eurpsy.2011.05.005

Patton, J. H., Stanford, M. S., & Barratt, E. S. (1995). Factor structure of the Barratt Impulsiveness Scale. *Journal of Clinical Psychology*, *51*, 768-774.

*Pearson, V., Phillips, M. R., He, F., & Ji, H. (2002). Attempted suicide among young rural women in the People's Republic of China: Possibilities for prevention. *Suicide and Life-Threatening Behavior*, *32*, 359-369. doi:10.1521/suli.32.4.359.22345

*Pendse, B., Westrin, A., & Engstrom, G. (1999). Temperament traits in seasonal affective disorder, suicide attempters with non-seasonal major depression, and healthy controls. *Journal of Affective Disorders*, *54*, 55-65. doi:10.1016/S0165-0327(98)00134-7

*Perez-Rodriguez, M. M., Baca-Garcia, E., Diaz-Sastre, C., Garcia-Resa, E., Ceverino, A., Saiz-Ruiz, J., . . . de Leon, J. (2008). Low serum cholesterol may be associated with suicide attempt history. *Journal of Clinical Psychiatry*, *69*, 1920-1927.

*Pfeffer, C. R., Conte, H. R., Plutchik, R., & Jerret, J. (1979). Suicidal behavior in latency-age children: An empirical study. *Journal of the American Academy of Child & Adolescent Psychiatry*, *18*, 679-692. doi:10.1080/15374417409532577

*Plutchik, R. (1995). Outward and inward directed aggressiveness: The interaction between violence and suicidality. *Pharmacopsychiatry*, *28*, 47-57. doi:10.1055/s-2007-979620

*Plutchik, R., & van Praag, H. (1989). The measurement of suicidality, aggressivity and impulsivity. *Progress in Neuropsychopharmacology & Biological Psychiatry*, *13*(Suppl.), S23-S34. doi:10.1016/0278-5846(89)90107-3

*Raja, M., & Azzoni, A. (2004). Suicide attempts: Differences between unipolar and bipolar patients and among groups with different lethality risk. *Journal of Affective Disorders*, *82*, 437-442. doi:10.1016/j.jad.2004.02.001

*Raust, A., Slama, F., Mathieu, F., Roy, I., Chenu, A., Koncke, D., . . . Bellivier, F. (2007). Prefrontal cortex dysfunction in patients with suicidal behavior. *Psychological Medicine*, *37*, 411-419. doi:10.1017/S0033291706009111

Razin, A. M., O'Dowd, M. A., Nathan, A., Rodriguez, I., Goldfield, A., Martin, C., . . . Mosca, J. (1991). Suicidal behavior among inner-city Hispanic adolescent females. *General Hospital Psychiatry*, *13*, 45-58. doi:10.1016/0163-8343(91)90009-L

*Renaud, J., Berlim, M. T., McGirr, A., Tousignant, M., & Turecki, G. (2008). Current psychiatric morbidity, aggression/impulsivity, and personality dimensions in child and adolescent suicide: A case-control study. *Journal of Affective Disorders*, *105*, 221-228. doi:10.1016/j.jad.2007.05.013

*Reynolds, B., Ortengren, A., Richards, J. B., & de Wit, H. (2006). Dimensions of impulsive behavior: Personality and behavioral measures. *Personality and Individual Differences*, *40*, 305-315. doi:10.1016/j.paid.2005.03.024

*Rhode, P., Seeley, J. R., & Mace, D. E. (1997). Correlates of suicidal behavior in a juvenile detention population. *Suicide and Life-Threatening Behavior*, *27*, 164-175. doi:10.1111/j.1943-278X.1997.tb00288.x

Rifai, A. H., Reynolds, C. F., & Mann, J. J. (1992). Biology of elderly suicide. *Suicide and Life-Threatening Behavior*, *22*, 48-61. doi:10.1111/j.1943-278X.1992.tb00475.x

Robins, E. (1981). *The final months: A study of the lives of 134 persons who committed suicide*. New York, NY: Oxford University Press.

Roggenbach, J., Muller-Oerlinghausen, B., & Franke, L. (2002). Suicidality, impulsivity and aggression—is there a link to 5HIAA concentration in the cerebrospinal fluid? *Psychiatry Research*, *113*, 193-206. doi:10.1016/S0165-1781(02)00230-5

*Roy, A. (2004). Impulsivity in drug dependent patients who attempt suicide. *Archives of Suicide Research*, *8*, 375-378. doi:10.1080/13811110490476761

*Schalling, D., Asberg, M., Edman, G., & Oreland, L. (1987). Markers for vulnerability to psychopathology: Temperament traits associated with platelet MAO. *Acta Psychiatrica Scandinavica*, *76*, 172-182. doi:10.1111/j.1600-0447.1987.tb02881.x

Selby, E. A., Anestis, M. D., & Joiner, T. E. (2007). Daydreaming about death: Violence daydreaming as a form of emotion dysregulation in suicidality. *Behavior Modification*, *31*, 867-879.

*Serretti, A., Mandelli, L., Giegling, I., Schneider, B., Hartmann, A. M., Schnabel, A., . . . Rujescu, D. (2007). HTR2C and HTR1A gene variants in German and Italian suicide attempters and completers. *American Journal of Medical Genetics Part B: Neuropsychiatric Genetics*, *144B*, 291-299. doi:10.1002/ajmg.b.30432

Shioiri, T., Nishimura, A., Akazawa, K., Abe, R., Nushida, H., Ueno, Y., . . . Someya, T. (2005). Incidence of note-leaving remains constant despite increasing suicide rates. *Psychiatry and Clinical Neurosciences*, *59*, 226-228. doi:10.1111/j.1440-1819.2005.01364.x

Simon, T. R., Swann, A. C., Powell, K. E., Potter, L. B., Kresnow, M., & O'Carroll, P. W. (2001). Characteristics of impulsive suicide attempts and attempters. *Suicide and Life-Threatening Behavior*, *32*, 49-59. doi:10.1521/suli.32.1.5.49.24212

Smith, A. R., Ribeiro, J., Mikolajewski, A., Taylor, J., Joiner, T., & Iacono, W. (2012). An examination of environmental and genetic contributions to the determinants of suicidal behavior among male twins. *Psychiatry Research*, *197*, 60-65. doi:10.1016/j.psychres.2012.01.010

Smith, A. R., Witte, T. K., Teale, N. E., King, S. L., Bender, T. W., & Joiner, T. E. (2008). Revisiting impulsivity in suicide: Implications for civil liability of third parties. *Behavioral Sciences & the Law*, *26*, 779-797. doi:10.1002/bsl.848

Smith, P. N., Cukrowicz, K. C., Poindexter, E. K., Hobson, V., & Cohen, L. M. (2010). The acquired capability for suicide: A comparison of suicide attempters, suicide ideators, and non-suicidal controls. *Depression and Anxiety*, *27*, 871-877. doi:10.1002/da.20701

*Soloff, P. H., Lis, J. A., Kelly, T., Cornelius, J., & Ulrich, R. (1994). Risk factors for suicidal behavior in borderline personality disorder. *American Journal of Psychiatry*, *151*, 1316-1323.

Soloff, P. H., Lynch, K. G., Kelly, T. M., Malone, K. M., & Mann, J. J. (2000). Characteristics of suicide attempts of patients with major depressive episode and borderline personality disorder: A comparative study. *American Journal of Psychiatry*, *157*, 601-608. doi:10.1176/appi.ajp.157.4.601

*Spokas, M., Wenzel, A., Brown, G. K., & Beck, A. T. (2012). Characteristics of individuals who make impulsive suicide attempts. *Journal of Affective Disorders*, *136*, 1121-1125. doi:10.1016/j.jad.2011.10.034

Stanley, B., Gameroff, M. J., Michalsen, V., & Mann, J. J. (2001). Are suicide attempters who self-mutilate a unique population? *American Journal of Psychiatry*, *158*, 427-432. doi:10.1176/appi.ajp.158.3.427

Stautz, K., & Cooper, A. (2013). Impulsivity-related personality traits and adolescent alcohol use: A meta-analytic review. *Clinical Psychology Review*, *33*, 574-592.

Suominen, K., Isometsa, E., Henriksson, M., Ostamo, A., & Lonnqvist, J. (1997). Hopelessness, impulsiveness and intent among suicide attempters with major depression, alcohol dependence, or both. *Acta Psychiatrica Scandinavica*, *96*, 142-149. doi:10.1111/j.1600-0447.1997.tb09919.x

*Swann, A. C., Dougherty, D. M., Pazzaglia, P. J., Pham, M., Steinberg, J. L., & Moeller, F. G. (2005). Increased impulsivity associated with severity of suicide attempt history in patients with bipolar disorder. *American Journal of Psychiatry*, *162*, 1680-1687. doi:10.1176/appi.ajp.162.9.1680

*Swann, A. C., Lijffijt, M., Lane, S. D., Steinberg, J. L., & Moeller, F. G. (2010). Interactions between bipolar disorder and antisocial personality disorder in trait impulsivity and severity of illness. *Acta Psychiatrica Scandinavica*, *121*, 453-461. doi:10.1111/j.1600-0447.2009.01528.x

Thamotharan, S., Lange, K., Zale, E. L., Huffhines, L., & Fields, S. (2013). The role of impulsivity in pediatric obesity and weight status: A meta-analytic review. *Clinical Psychology Review*, *33*, 253-262.

*Tremeau, F., Darreye, A., Staner, L., Correa, H., Weibel, H., Khidichian, F., & Macher, J. P. (2008). Suicidality in opioid-dependent subjects. *The American Journal on Addictions*, *17*, 187-194. doi:10.1080/10550490802020160

Van Orden, K. A., Witte, T. K., Gordon, K. H., Bender, T. W., & Joiner, T. E. (2008). Suicidal desire and the capability for suicide: Tests of the interpersonal-psychological theory of suicidal behavior among adults. *Journal of Consulting and Clinical Psychology*, *76*, 72-83. doi:10.1037/0022-006X.76.1.72

*Verkes, R. J., Pijl, H., Meinders, E., & Van Kempen, G. M. J. (1996). Borderline personality, impulsiveness, and platelet monoamine measures in bulimia nervosa and recurrent suicidal behavior. *Biological Psychiatry*, *40*, 173-180. doi:10.1016/0006-3223(95)00384-3

Verkes, R. J., Van der Mast, R. C., Kerkhof, A. J. F. M., Fekkes, D., Hengeveld, M. W., Tuyl, J. P., & Van Kempen, G. M. J. (1998). Platelet serotonin, monoamine oxidase activity, and [3H]paroxetine binding related to impulsive suicide attempts and borderline personality disorder. *Biological Psychiatry*, *43*, 740-746. doi:10.1016/S0006-3223(97)00317-X

Westheide, J., Quednow, B. B., Kuhn, K., Hoppe, C., Cooper-Mahkorn, D., Hawellek, B., . . . Wagner, M. (2008). Executive performance of depressed suicide attempters: The role of suicidal ideation. *European Archives of Psychiatry & Clinical Neuroscience*, *258*, 414-421. doi:10.1007/s00406-008-0811-1

Weyrauch, K. F., Roy-Byrne, P., Katon, W., & Wilson, L. (2001). Stressful life events and impulsiveness in failed suicide. *Suicide and Life-Threatening Behavior*, *31*, 311-319. doi:10.1521/suli.31.3.311.24240

Whiteside, S. P., & Lynam, D. R. (2001). The five factor model and impulsivity: Using a structural model of personality to understand impulsivity. *Personality and Individual Differences*, *30*, 669-689. doi:10.1016/S0191-8869(00)00064-7

*Williams, C. L., Davidson, J. A., & Montgomery, I. (1980). Impulsive suicidal behavior. *Journal of Clinical Psychology*, *36*, 90-94. doi:10.1002/1097-4679(198001)36:1<90::AID-JCLP2270360104>3.0.CO;2-F

Witte, T. K., Merrill, K. A., Stellrecht, N. E., Bernert, R. A., Hollar, D. L., Schatschneider, C., & Joiner, T. E. (2008). "Impulsive" youth suicide attempters are not necessarily all that impulsive. *Journal of Affective Disorders*, *107*, 107-116. doi:10.1016/j.jad.2007.08.010

Wojnar, M., Ilgen, M. A., Czyz, E., Strobbe, S., Klimkiewicz, A., Jakubczyk, A., . . . Brower, K. J. (2009). Impulsive and non-impulsive suicide attempts in patients treated for alcohol dependence. *Journal of Affective Disorders*, *115*, 131-139. doi:10.1016/j.jad.2008.09.001

Wojnar, M., Ilgen, M. A., Jakubczyk, A., Wnorowska, A., Klimkiewicz, A., & Brower, K. J. (2008). Impulsive suicide attempts predict post-treatment relapse in alcohol-dependent patients. *Drug and Alcohol Dependence*, *97*, 268-275. doi:10.1016/j.drugalcdep.2008.04.006

Wong, S. P. Y., & Phillips, M. R. (2009). Nonfatal suicidal behavior among Chinese women who have been physically abused by their male intimate partners. *Suicide and Life-Threatening Behavior*, *39*, 648-658. doi:10.1521/suli.2009.39.6.648

*Wu, C., Liao, S., Lin, K., Tseng, M. M., Wu, E. C., & Liu, S. (2009). Multidimensional assessments of impulsivity in subjects with history of suicidal attempts. *Comprehensive Psychiatry*, *50*, 315-321. doi:10.1016/j.comppsych.2008.09.006

Wyder, M., & de Leo, D. (2007). Behind impulsive suicide attempts: Indications from a community study. *Journal of Affective Disorders*, *104*, 167-173. doi:10.1016/j.jad.2007.02.015

*Yen, S., Shea, M. T., Sanislaw, C. A., Grilo, C. M., Skodol, A. E., Gunderson, J. G., . . . Morey, L. C. (2004). Borderline personality disorder criteria associated with prospectively observed suicidal behavior. *American Journal of Psychiatry*, *161*, 1296-1298. doi:10.1176/appi.ajp.161.7.1296

*Yen, S., Shea, M. T., Sanislow, C. A., Skodol, A. E., Grilo, C. M., Edelen, M. O., . . . Gunderson, J. G. (2009). Personality traits as prospective predictors of suicide attempts. *Acta Psychiatrica Scandinavica*, *120*, 222-229. doi:10.1111/j.1600-0447.2009.01366.x

*Zaitsoff, S. L., & Grilo, C. M. (2010). Eating disorder psychopathology as a marker of psychosocial distress and suicide risk in female and male adolescent psychiatric inpatients. *Comprehensive Psychiatry*, *51*, 142-150. doi:10.1016/j.comppsych.2009.03.005

*Zalsman, G., Patya, M., Frisch, A., Ofek, H., Schapir, L., Blum, I., . . . Tyano, S. (2011). Association of polymorphisms of the serotonergic pathways with clinical traits of impulsive-aggression and suicidality in adolescents: A multi-center study. *World Journal of Biological Psychiatry*, *12*, 33-41. doi:10.3109/15622975.2010.518628

Published in final edited form as:
Clin Psychol (New York). 2014 December ; 21(4): 398–409. doi:10.1111/cpsp.12082.

Consequences of Making Weight: A Review of Eating Disorder Symptoms and Diagnoses in the United States Military

Lindsay Bodell,
Florida State University

Katherine Jean Forney,
Florida State University

Pamela Keel,
Florida State University

Peter Gutierrez, and
Denver VA Medical Center

Thomas E. Joiner
Florida State University

Abstract

Eating disorders are serious psychiatric illnesses associated with health problems. Such problems may compromise military performance, highlighting the need to establish the level of eating pathology that exists in military samples. This article qualitatively reviews prevalence estimates of eating disorder symptoms and diagnoses in military samples, providing nonmilitary estimates for context. Findings suggest that eating disorder symptoms are prevalent in cadets and active duty service members, especially when using self-report measures. The increased salience of weight in the military and increased exposure to trauma may influence risk for eating disorders. Alternatively, individuals at risk for eating disorders may self-select into the military. Overall, this review suggests that eating disorder symptoms are common in military samples and that further research is warranted.

Keywords

eating disorder symptoms; eating disorders; military; purging; risk factors; veterans

It is well established that factors that increase emphasis on shape and weight increase risk for eating disorders in men and women (e.g., Keel & Forney, 2013). As such, the military may represent one group at risk for eating disorders, given the specific weight requirements for service (United States Army, 2006). Indeed, the main objectives of the Army Weight Control Program are to ensure that all personnel are able to meet physical demands of their duties and present a trim military appearance (United States Army, 2006). These objectives

Address correspondence to Thomas E. Joiner, Florida State University, Department of Psychology, 1107 West Call Street, Tallahassee, FL 32306. joiner@psy.fsu.edu.

indicate that excessive body fat "connotes a lack of personal discipline," "distracts from military appearance," and "may indicate a poor state of health, physical fitness, or stamina" (United States Army, 2006, p. 1). These objectives not only place a necessary emphasis on health and physicality but also place emphasis on general appearance, which may increase body dissatisfaction and/or concerns about weight and shape. In addition to increased emphasis on shape and weight, exposure to traumatic experiences, such as combat, may increase risk for developing eating disorders. Previous studies have found high lifetime prevalence of traumatic events in women with anorexia nervosa (AN) and bulimia nervosa (BN), with greater posttraumatic stress symptomatology associated with greater severity of eating disorder symptoms (e.g., Tagay, Schlottbohm, Reyes-Rodriguez, Repic, & Senf, 2014).

Eating disorder behaviors, such as self-induced vomiting, are associated with severe health problems (Brown & Mehler, 2013) and psychosocial impairment (Mitchison, Hay, Slewa-Younan, & Mond, 2012) that may be particularly impactful on military performance, given the physical strength and cognitive requirements of the military. Presence of an eating disorder or eating disorder symptoms may limit possibilities for career advancement within the military, further impacting overall quality of life for service members and their families. Importantly, eating disorders themselves are associated with increased risk of suicide, with a recent meta-analysis finding standardized mortality ratios for suicide for AN and BN to be 31 and 7.5, respectively (Preti, Rocchi, Sisti, Camboni, & Miotto, 2011). The military has suffered from increased suicide over the past several years (Kang & Bullman, 2008), and it is possible that eating disorders may contribute additional risk of suicide in this population.

Individuals in the military may be reluctant to disclose information that might influence promotion or deployment or both. Eating disorders are associated with significant stigma (Stewart, Keel, & Schiavo, 2006), and mental health problems in general are stigmatized in the military (Greene-Shortridge, Britt, & Castro, 2007). This stigma may influence responses, and thus prevalence estimates, on surveys and interviews regarding mental health symptoms. In civilian samples, higher eating disorder prevalence is found using questionnaire versus interview assessments (Keel, Crow, Davis, & Mitchell, 2002), which may be a function of an individual's willingness to disclose information based on the increased anonymity associated with questionnaires (Anderson, Simmons, Milnes, & Earleywine, 2007; Keel et al., 2002; Lavender & Anderson, 2009) or misunderstanding questions being asked or both. Thus, multiple methods of ascertainment are needed to understand prevalence estimates of eating disorders in the military.

The purpose of this article is to review studies examining the prevalence of eating disorder symptoms and diagnoses in military samples. To examine the hypothesis that emphasis on weight for fitness tests is associated with increases in eating disorder symptoms, we also reviewed studies specifically examining presence of eating disorder symptoms during fitness testing periods. We include findings from similar studies in civilian samples to provide a context for interpreting military findings. Implications and future directions are discussed.

METHODS

Articles were identified by electronic searches of Psyc-INFO and PubMed databases using a combination of the search terms “eating disorders,” “anorexia nervosa,” “bulimia nervosa,” “eating disorder symptoms,” “disordered eating,” “military,” “army,” “navy,” “air force,” “marines,” and “veterans.” References of articles were scanned to include any additional relevant articles. When more than one study using similar methods (e.g., self-report) provided prevalence estimates of eating disorder diagnoses or symptoms (i.e., self-induced vomiting, laxative use, diet pill use, and binge eating), weighted averages were calculated for prevalence estimates across studies. Given sex differences in the prevalence of eating disorders and symptoms (American Psychiatric Association, 2013), weighted averages were calculated separately in women and men. To provide context for estimates found in military samples, prevalence estimates in nonmilitary samples are presented. Nonmilitary samples were identified by electronic searches using search terms based on information obtained from the military articles (e.g., “eating disorder inventory,” “prevalence,” and “anorexia nervosa”). Articles in nonmilitary samples were then scanned to identify ones that used similar assessment measures (i.e., specific questionnaires or wording on surveys) and demographic information (i.e., age) as studies conducted in the military. College samples were used as comparisons for recruit samples due to their similarity in age, when eating disorders commonly develop (Hudson, Hiripi, Pope, & Kessler, 2007), and the nature of their social/peer environment.

As this review focuses on eating disorder symptoms and diagnoses in the United States military, articles were excluded if authors solely examined overweight, obesity, changes in food intake and body weight, or only included non–United States samples. All articles were independently reviewed to determine relevance to the current manuscript. Seventeen articles on eating disorders in the military were identified. Of these articles, one was excluded because it did not report demographic information or prevalence of individual symptoms (Sweeny & Bonnabeau, 1990), and one was excluded because it only included dieting prevalence (Haddock et al., 1999), resulting in review of 15 articles. Seven articles from nonmilitary samples are included along with prevalence estimates from population-based studies (Hudson et al., 2007).

RESULTS

Eating Disorder Risk

Studies conducted in cadets or active duty military personnel suggest high risk of eating disorders in these groups (see Table 1 for women; Table 2 for men). The percentage of female cadets at risk for eating disorders ranged from 20 to 29.6% across samples. Similarly, 33.6% of a sample of active duty females scored in the at-risk range (Lauder, Williams, Campbell, Davis, & Sherman, 1999). Studies conducted in nonmilitary female college samples have found estimates ranging from 10 to 16% (Forney & Ward, 2013; Klemchuk, Hutchinson, & Frank, 1990), with estimates in female collegiate athletes ranging from 25 to 58% (Johnson, Powers, & Dick, 1999). Fewer studies have examined the prevalence of males at risk for eating disorders. The percentage of male military cadets at risk for developing eating disorders ranged from 2 to 7% across two independent samples, which

does not exceed those found for nonmilitary college males (e.g., Forney & Ward, 2013; see Table 3).

Purging Behaviors

Self-report surveys also indicate high prevalence of purging behaviors (i.e., vomiting, laxative use, and diet pill use) in female military samples. Across three studies, prevalence estimates of vomiting ranged from 3% in active duty females up to 5.2% in female cadets. Prevalence estimates for laxative use in women ranged from 3.9 to 9.7%, and prevalence estimates for diet pill use in women ranged from 8.5 to 18%. Only one study examined purging behaviors in active duty men (McNulty, 1997a), which found approximately 3.7% endorsed self-induced vomiting, 3.5% endorsed diet pill use, and 3.4% endorsed laxative use. In contrast, prevalence estimates from a community-based study in men in their 30s were 0.5%, 0%, and 0% for vomiting, laxative use, and diet pill use, respectively (Heatherton, Mahamedi, Striepe, Field, & Keel, 1997). Importantly, the time frame across which prevalence estimates were determined is not consistent or reported in all studies, making comparisons across studies very difficult. Furthermore, limited information was provided on laxative and diet pill use, so it is unclear whether reported prevalence reflects use that was excessive or inappropriate.

Binge Eating

Binge eating, defined as the consumption of an unusually large amount of food and feeling a sense of loss of control while eating, is a common feature in eating disorders and appears prevalent in military samples as well. Across three studies in female military personnel and cadets, the average prevalence of binge eating was 19.3%. Estimates of current binge eating in community and college-based samples of women range from 12 to 16.2% (Heatherton et al., 1997; Johnson et al., 1999). The only study conducted in male sailors found 24.8% of the sample endorsed binge eating over the preceding three-month period (McNulty, 1997a). Reports of binge eating in community-based samples of men have been estimated around 9.9% (Heatherton et al., 1997). Thus, binge eating in military samples may be elevated; however, prevalence should be interpreted with caution, as none of the military studies specifically reported how binge eating was assessed. As such, participants' endorsement of binge eating may not be defined in accordance with the diagnostic criteria in the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 2013), which could lead to over-or underestimates of prevalence.

Eating Disorder Diagnoses

Weighted prevalence estimates using self-report surveys for active duty females found a prevalence of 1.6% for AN and 9.7% for BN (McNulty, 1997b, 2001; Table 1). Furthermore, a longitudinal military population-based study found 5.5% of women at baseline (predeployment) met diagnostic criteria for an eating disorder, including BN, subclinical BN, binge eating disorder (BED), or subclinical BED (Jacobson et al., 2009). An additional 3.3% of women developed an eating disorder (new onset) at 1–5-year follow-up. In community-based samples, 5% of women in their 30s met criteria for a bulimic syndrome, a term that encompasses BN, subthreshold BN, BED, and purging disorder (i.e.,

vomiting in the absence of binge eating; Keel & Heatherton, 2010). Prevalence estimates of AN and BN among women were 0.9% and 1.5%, respectively, in a nationally representative population-based study (Hudson et al., 2007).

Jacobson et al. (2009) found 4.0% of military men met criteria for an eating disorder at baseline, and 2.6% developed an eating disorder (new onset) at 1–5-year follow-up. Only one study specifically reported prevalence estimates for AN and BN in active duty men (2.5% and 6.8%, respectively; McNulty, 1997a). In contrast, estimates in civilian and population-based samples range from 0.8 to 4% across diagnoses (Hudson et al., 2007; Keel & Heatherton, 2010; Keel, Heatherton, Dorer, Joiner, & Zalta, 2006). Although McNulty (1997a, 1997b, 2001) provides prevalence estimates of eating disorder not otherwise specified (EDNOS) ranging from 35.8 to 62.8%, heterogeneity in EDNOS groups, low response rates (e.g., 28–54%), and failure to report diagnostic algorithms make all prevalence estimates difficult to contextualize with noncivilian samples and should be interpreted cautiously.

Approximately 15.6% of a sample of female veterans reported a lifetime eating disorder using a phone interview (Forman-Hoffman, Mengeling, Booth, Torner, & Sadler, 2012). This prevalence may be elevated compared to lifetime prevalence estimates in civilian samples (i.e., 5.9%; Hudson et al., 2007). Importantly, diagnostic criteria were not specifically assessed in the study by Forman-Hoffman et al. (2012); an eating disorder was determined by positive responses to the questions “have you ever been diagnosed with an eating disorder” or “have you ever suffered from an eating disorder.” Furthermore, the authors do not report whether the female veterans had an eating disorder before, after, or during military involvement, making it unclear whether serving in the military increases risk for developing eating disorders.

In contrast to self-report methods, diagnostic interviews have the benefit of ensuring that symptoms co-occur over the same time period to form a syndrome and that participants understand what is meant by certain diagnostic features (e.g., that binge episodes involve an objectively large amount of food and a loss of control over eating). To combine the benefits of increased sensitivity of self-report assessments with increased specificity of interview assessments, studies often employ a two-stage design in which individuals are screened for a possible eating disorder with self-report questionnaires and then interviewed to confirm diagnoses. This two-stage design has yielded point prevalence estimates of 0.2% for AN, 0.07–1.2% for BN (Beekley et al., 2009; Lauder et al., 1999), and 1.2% for BED (Lauder et al., 1999); 12-month estimates in the general population are 0% AN, 0.5% BN, and 1.6% BED (Hudson et al., 2007). Furthermore, Beekley et al. (2009) found prevalence over a seven-year period in male military cadets to be 0% for AN and 0.02% for BN. No methodologically similar studies were found for college men.

Finally, three studies have reported prevalence of eating disorders in the military using medical records data (Antczak & Brininger, 2008; Maguen et al., 2012; Striegel-Moore, Garvin, Dohm, & Rosenheck, 1999). The weighted prevalence estimates for women were 0.22% and 0.71% for AN and BN, respectively; however, the range was large (Table 1). The weighted average prevalence of any eating disorder in women was 0.55% (Table 1). For

men, weighted average prevalence estimates based on two studies were 0.008% for AN and 0.0015% for BN (Table 2). Additionally, two studies reported prevalence estimates for eating disorder diagnoses broadly, with weighted prevalence estimated to be 0.03% (Table 2). In contrast, Striegel-Moore et al. (2008) examined rates of eating disorders in a civilian outpatient sample based on diagnostic codes from patients' charts from a large healthcare organization and found 0.32% of women and 0.02% of men were diagnosed with an eating disorder.

Eating Disorder Symptoms and Fitness Testing Periods

As described previously, military weight standards and fitness tests may contribute to eating disorder symptoms in the military by increasing the salience of weight and shape. If so, estimates collected during fitness testing periods, when weight is more salient, may be elevated compared to other times. Supporting this idea, McNulty (1997a) found approximately three times as many male sailors endorsed eating disorder symptoms, including self-induced vomiting and laxative use, prior to military fitness testing periods compared to nonfitness testing periods. In another study, 279 male and 210 female service members completed self-report surveys prior to a physical fitness assessment, and a large percentage reported engaging in purging behaviors, including self-induced vomiting (5%) and use of laxatives, diuretics, or diet pills (18%) in order to lose weight prior to the fitness test (Carlton, Manos, & Van Slyke, 2005). Notably, the response rate for the surveys was low (i.e., 30%), which may have biased results (Carlton et al., 2005). Purging behaviors during nonfitness assessment periods were not reported, making it unclear whether the fitness assessment period was associated with an increase in reported symptoms. In another study, Peterson, Talcott, Kelleher, and Smith (1995) examined military weight standards as a risk factor for eating disorder symptoms by comparing overeating episodes and extreme weight control behaviors in women and men enrolled in a military weight management program to both a civilian weight management program and a normal weight military group. To our knowledge, this is the only study that has included specific comparison samples in the examination of eating disorder symptoms in the military. The military weight management group was more likely to engage in diuretic use compared to the nonweight management military group and was four times as likely to report vomiting compared to both groups; however, this finding was not statistically significant. These results were found despite the civilian comparison group having a greater proportion of women than the military weight management group (87% versus 35%). Given that sex is a robust risk factor for eating disorder symptoms (Keel & Forney, 2013), findings suggest that the impact of the weight management group may be beyond that of gender.

DISCUSSION

Overall, findings suggest that a high prevalence of women and men in the military is at risk for eating disorders, engage in purging behaviors to lose weight, and may have eating disorder diagnoses. However, similar to findings from nonmilitary samples, there is a large discrepancy between prevalence estimates based on self-report versus interview or medical records data or both, highlighting the importance of further examining eating disorders in the military as well as understanding the best methods for accurate assessment.

The discrepancy in prevalence estimates in military samples may be due to either overreporting on self-report surveys or underreporting on interviews. Individuals may overreport on self-report surveys if they do not understand the questions asked, resulting in false positives. Alternatively, it is possible that eating disorder symptoms are being underreported during interview formats or that eating disorders are being underdiagnosed due to individuals in the military not seeking treatment for their eating problems. Although many individuals with eating disorders do not seek treatment for their symptoms (Hart, Granillo, Jorm, & Paxton, 2011; Mond, Hay, Rodgers, & Owen, 2007), this phenomenon may be exaggerated in members of the military due to perceived stigmatization associated with an eating disorder diagnosis (Greene-Shortridge et al., 2007; Roehrig & McLean, 2010; Stewart et al., 2006) and perceived consequences of being deemed unfit to serve, especially in a male-dominated career (Department of Defense, 2012). In turn, individuals may be more willing to report eating disorder symptoms on surveys than during a medical visit, potentially due to greater feelings of anonymity with survey questions (Keel et al., 2002). Although there are differences in prevalence estimates based on methodology, these differences may also reflect differences in military involvement (e.g., different branches of the military, college-aged ROTC students, veterans). For example, the three studies examining prevalence estimates from medical records data were based on participants in the VA healthcare system, a group who is likely older and thus beyond the peak age of onset for eating disorders. More work is needed to understand which groups within the military are most at risk.

Given that eating disorder symptoms appear prevalent in the military, it is important to understand why this may be. As previously mentioned, increased salience of shape and weight or external pressures to lose weight in the military may influence eating behavior or development of eating disorders. Supporting this interpretation, some studies suggest increased eating pathology during fitness testing periods or in specific groups of the military (e.g., weight management programs; Carlton et al., 2005; Peterson et al., 1995). Importantly, eating disorder risk factors such as extreme dieting and eating disorders themselves often begin prior to age 18 (Vohs, Heatherton, & Herrin, 2001), suggesting some symptoms observed in service members may have existed prior to entering the military. Individuals who might be vulnerable to eating disorders may self-select into the military. For example, individuals who overexercise or have high shape and weight concerns may be drawn to the military, given the training environment and emphasis on physicality. Consistent with this idea, Garber, Boyer, Pollack, Chang, and Shafer (2008) found that a large proportion of their female sample endorsed symptoms of eating disorders prior to joining the military.

Increased exposure to stress and trauma has also been linked to the development of eating disorders both in civilian and military samples (Brewerton, 2007; Forman-Hoffman et al., 2012; Rayworth, Wise, & Harlow, 2004). Indeed, women who were deployed and experienced combat were almost twice as likely to develop an eating disorder as women who were deployed but did not have combat exposure (Jacobson et al., 2009). Although many of the studies reviewed were conducted in recruits who have not been deployed, findings from Jacobson et al. (2009) highlight the importance of assessing the potential emergence or exacerbation of an eating disorder after trauma. Furthermore, these findings

suggest that targeted intervention for eating problems may be beneficial for service members who have been deployed and exposed to combat.

Overall, findings suggest that screening for and prevention of eating disorders and symptoms across the military may be warranted. In particular, the use of assessment methods with greater perceived anonymity may be more beneficial than face-to-face interviews for identifying individuals at risk for eating disorders or other mental health problems. It is important to make such procedures or interventions accessible given the stigma associated with such problems. One model to increase accessibility and reduce stigma is that used by the Man Therapy Program™, an interactive web-based program designed to reach out to men most at risk for suicide and least likely to seek help on their own (Spencer-Thomas, Hindman, & Conrad, 2014). This program attempts to use humor to decrease stigma and confront important issues such as depression and suicide. A recent evaluation of the program found high rates of satisfaction and increased likelihood of seeking help after visiting the site (Spencer-Thomas et al., 2014). Tailoring this type of program to service members and focusing on problematic eating may be one approach to reduce stigma and increase accessibility of early intervention or prevention programs.

Although the current evidence suggests eating disorders and symptoms are common in the military, more rigorous research is needed to make any strong conclusions. For example, studies conducted in the military suggest high prevalence of binge eating; however, none of the studies included specific information regarding how the episodes were assessed. It is possible that individuals in the military, particularly active duty personnel, may go without food based on surrounding circumstances and then feel as though they binged, which may greatly overestimate occurrence of binge eating episodes. Similarly, extreme physical activity may lead individuals to eat a large amount of food and endorse overeating, although the amount of food may be appropriate given the circumstance. Furthermore, many of the studies did not report average body mass index or percentage of participants who were overweight. The military's weight selection criteria may have contributed to high prevalence estimates simply due to higher base rates of AN and BN in nonover-weight samples. The small number of studies and paucity of longitudinal designs do not allow conclusions about the temporal relationship of eating disorder symptoms and military service. Many of the studies have poor response rates or limited information regarding ascertainment of diagnoses, increasing concerns about interpretation and generalizability of findings. We were unable to conduct a meta-analytic review of the current studies or include meaningful prevalence estimates of EDNOS. In particular, BED has been defined as a distinct diagnosis in the *DSM-5*, highlighting the importance for future studies of eating disorders in the military to specifically examine BED. Nonetheless, studies that have been conducted suggest that further examination of eating disorders in the military is warranted.

Future research should use longitudinal designs to better understand the temporal development of eating disorders within the military as well as more specific risk factors associated with eating disorders in this population. Similarly, researchers should examine which specific populations are more at risk for eating disorder symptoms, such as recruits, who fall within the peak age range for eating disorder onset, or those trying to "make weight" in military weight management programs. It would also be interesting to examine

potential gender differences in eating disorder symptoms in the military and whether differences are comparable to those in nonmilitary settings. For example, research should examine whether men in the military are more prone to certain types of eating disorder symptoms, such as excessive exercise, compared to either men not in the military or women in the military.

In summary, the military represents one group of individuals in which examination of eating and other psychiatric disorders is crucial. It is important for military personnel to increase awareness of eating disorder risk in the military and decrease stigma associated with these illnesses to minimize barriers to treatment to reduce the burden from these serious mental disorders. Better understanding of risk factors associated with eating disorder symptoms and diagnoses in the military may help foster appropriate prevention and treatment approaches to decrease additional risk of injury and death in service members.

ACKNOWLEDGMENTS

This work was in part supported by the Military Suicide Research Consortium (MSRC), an effort supported by the Office of the Assistant Secretary of Defense for Health Affairs under Award No. (W81XWH-10-2-0181). Opinions, interpretations, conclusions, and recommendations are those of the authors and are not necessarily endorsed by the MSRC or the Department of Defense. Additionally, this work was supported in part by National Institute of Mental Health Training Grant T32 MH093311.

REFERENCES

American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed.. Washington, DC: Author; 2013.

Anderson DA, Simmons AM, Milnes SM, Earleywine M. Effect of response format on endorsement of eating disordered attitudes and behaviors. International Journal of Eating Disorders. 2007; 40(1): 90–93. [PubMed: 17245846]

Antczak AJ, Brininger TL. Diagnosed eating disorders in the U.S. military: A nine year review. Eating Disorders. 2008; 16:363–377. [PubMed: 18821361]

Beekley MD, Byrne R, Yavorek T, Kidd K, Wolff J, Johnson M. Incidence, prevalence, and risk of eating disorder behaviors in military academy cadets. Military Medicine. 2009; 174(6):637–641. [PubMed: 19585779]

Brewerton TD. Eating disorders, trauma, and comorbidity: Focus on PTSD. Eating Disorders. 2007; 15:285–304. [PubMed: 17710567]

Brown CA, Mehler PS. Medical complications of self-induced vomiting. Eating Disorders. 2013; 21(4):287–294. [PubMed: 23767670]

Carlton JR, Manos GH, Van Slyke JA. Anxiety and abnormal eating behaviors associated with cyclical readiness testing in a naval hospital active duty population. Military Medicine. 2005; 170(8):663–667. [PubMed: 16173205]

Department of Defense. 2012 Demographics: Profile of the military community. Washington, DC: Office of the Deputy Assistant Secretary of Defense; 2012.

Forman-Hoffman VL, Mengeling M, Booth BM, Torner J, Sadler AG. Eating disorders, posttraumatic stress, and sexual trauma in women veterans. Military Medicine. 2012; 177(10):1161–1168. [PubMed: 23113442]

Forney KJ, Ward RM. Examining the moderating role of social norms between body dissatisfaction and disordered eating in college students. Eating Behaviors. 2013; 14:73–78. [PubMed: 23265406]

Garber AK, Boyer CB, Pollack LM, Chang YJ, Shafer MA. Body mass index and disordered eating behaviors are associated with weight dissatisfaction in adolescent and young adult female military recruits. Military Medicine. 2008; 173(2):138–145. [PubMed: 18333489]

Greene-Shortridge TM, Britt TW, Castro CA. The stigma of mental health problems in the military. Military Medicine. 2007; 172(2):157–161. [PubMed: 17357770]

Haddock CK, Poston WS, Klesges RC, Talcott GW, Lando H, Dill PL. An examination of body weight standards and the association between weight and health behaviors in the United States Air Force. Military Medicine. 1999; 164(1):51–54. [PubMed: 9922645]

Hart LM, Granillo MT, Jorm AF, Paxton SJ. Unmet need for treatment in the eating disorders: A systematic review of eating disorder specific treatment seeking among community cases. Clinical Psychology Review. 2011; 31:727–735. [PubMed: 21501580]

Heatherton TF, Mahamedi F, Striepe M, Field AE, Keel P. A 10-year longitudinal study of body weight, dieting, and eating disorder symptoms. Journal of Abnormal Psychology. 1997; 106(1): 117–125. [PubMed: 9103723]

Hudson JI, Hiripi E, Pope HG Jr. Kessler RC. The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. Biological Psychiatry. 2007; 61:348–358. [PubMed: 16815322]

Jacobson IG, Smith TC, Smith B, Keel PK, Amoroso PJ, Wells TS, Ryan MA. Disordered eating and weight changes after deployment: Longitudinal assessment of a large US military cohort. American Journal of Epidemiology. 2009; 169:415–427. [PubMed: 19193718]

Johnson C, Powers PS, Dick R. Athletes and eating disorders: The National Collegiate Athletic Association study. International Journal of Eating Disorders. 1999; 26(2):179–188. [PubMed: 10422607]

Kang HK, Bullman TA. Risk of suicide among U.S. veterans after returning from the Iraq or Afghanistan war zones. Journal of the Americal Medical Association. 2008; 300:652–653.

Keel PK, Crow S, Davis TL, Mitchell JE. Assessment of eating disorders: Comparison of interview and questionnaire data from a long-term follow-up study of bulimia nervosa. Journal of Psychosomatic Research. 2002; 53(5):1043–1047. [PubMed: 12445594]

Keel PK, Forney KJ. Psychosocial risk factors for eating disorders. International Journal of Eating Disorders. 2013; 46:433–439. [PubMed: 23658086]

Keel PK, Heatherton TF. Weight suppression predicts maintenance and onset of bulimic syndromes at 10-year follow-up. Journal of Abnormal Psychology. 2010; 119:268–275. [PubMed: 20455599]

Keel PK, Heatherton TF, Dorer DJ, Joiner TE, Zalta AK. Point prevalence of bulimia nervosa in 1982, 1992, and 2002. Psychological Medicine. 2006; 36:119–127. [PubMed: 16202192]

Klemchuk HP, Hutchinson CB, Frank RI. Body dissatisfaction and eating-related problems on the college campus: Usefulness of the Eating Disorder Inventory with a nonclinical population. Journal of Counseling Psychology. 1990; 37(3):297–305.

Lauder TD, Campbell CS. Abnormal eating behaviors in female reserve officer training corps cadets. Military Medicine. 2001; 166(3):264–268. [PubMed: 11263032]

Lauder TD, Williams MV, Campbell CS, Davis GD, Sherman RA. Abnormal eating behaviors in military women. Medicine & Science in Sports & Exercise. 1999; 31(9):1265–1271. [PubMed: 10487367]

Lavender JM, Anderson DA. Effect of perceived anonymity in assessments of eating disordered behaviors and attitudes. International Journal of Eating Disorders. 2009; 42(6):546–551. [PubMed: 19172594]

Maguen S, Cohen B, Cohen G, Madden E, Bertenthal D, Seal K. Eating disorders and psychiatric comorbidity among Iraq and Afghanistan veterans. Women's Health Issues. 2012; 22:e403–e406. [PubMed: 22749199]

McNulty PA. Prevalence and contributing factors of eating disorder behaviors in active duty Navy men. Military Medicine. 1997a; 162(11):753–758. [PubMed: 9358723]

McNulty PA. Prevalence and contributing factors of eating disorder behaviors in a population of female Navy nurses. Military Medicine. 1997b; 162(10):703–706. [PubMed: 9339088]

McNulty PA. Prevalence and contributing factors of eating disorder behaviors in active duty service women in the Army, Navy, Air Force, and Marines. Military Medicine. 2001; 166(1):53–58. [PubMed: 11197099]

Mitchison D, Hay P, Slewa-Younan S, Mond J. Time trends in population prevalence of eating disorder behaviors and their relationship to quality of life. PLoS One. 2012; 7(11):e48450. [PubMed: 23144886]

Mond JM, Hay PJ, Rodgers B, Owen C. Health service utilization for eating disorders: Findings from a community-based study. International Journal of Eating Disorders. 2007; 40:399–408. [PubMed: 17497708]

Peterson AL, Talcott GW, Kelleher WJ, Smith SD. Bulimic weight-loss behaviors in military versus civilian weight-management programs. Military Medicine. 1995; 160(12):616–620. [PubMed: 8775386]

Preti A, Rocchi MB, Sisti D, Camboni MV, Miotto P. A comprehensive meta-analysis of the risk of suicide in eating disorders. Acta Psychiatrica Scandinavica. 2011; 124(1):6–17. [PubMed: 21092024]

Rayworth BB, Wise LA, Harlow BL. Childhood abuse and risk of eating disorders in women. Epidemiology. 2004; 15(3):271–278. [PubMed: 15097006]

Roehrig JP, McLean CP. A comparison of stigma toward eating disorders versus depression. International Journal of Eating Disorders. 2010; 43:671–674. [PubMed: 19816860]

Spencer-Thomas, S.; Hindman, J.; Conrad, J. Man Therapy™: Outreach and impact on men's mental health program 10 months after launch. 2014. Retrieved from Man Therapy™ website: http://mantherapy.org/pdf/White-Paper-Man-Therapy.pdf

Stewart MC, Keel PK, Schiavo RS. Stigmatization of anorexia nervosa. International Journal of Eating Disorders. 2006; 39:320–325. [PubMed: 16523470]

Striegel-Moore RH, DeBar L, Wilson GT, Dickerson J, Rosselli F, Perrin N, Kraemer HC. Health services use in eating disorders. Psychological Medicine. 2008; 38:1465–1474. [PubMed: 17976250]

Striegel-Moore RH, Garvin V, Dohm FA, Rosenheck RA. Eating disorders in a national sample of hospitalized female and male veterans: Detection rates and psychiatric comorbidity. International Journal of Eating Disorders. 1999; 25(4):405–414. [PubMed: 10202651]

Sweeny SS, Bonnabeau RC. Positive and negative health behaviors used to ensure compliance with the U.S. Army's weight control standards by a reserve component unit. Military Medicine. 1990; 155(6):255–260. [PubMed: 2122300]

Tagay S, Schlottbohm E, Reyes-Rodriguez ML, Repic N, Senf W. Eating disorders, trauma, PTSD, and psychosocial resources. Eating Disorders: The Journal of Treatment and Prevention. 2014; 22:33–49.

United States Army. The Army Weight Control Program. Washington, DC: Headquarters Department of the Army; 2006.

Vohs KD, Heatherton TF, Herrin M. Disordered eating and the transition to college: A prospective study. International Journal of Eating Disorders. 2001; 29:280–288. [PubMed: 11262506]

Warner C, Matuszak T, Rachal J, Flynn J, Grieger TA. Disordered eating in entry-level military personnel. Military Medicine. 2007; 172(2):147–151. [PubMed: 17357768]

Table 1

Eating disorder symptoms and diagnoses in female service members

Study	*N*	Age	Sample Type	BMI kg/m^2 (Range)	% at Risk	Measure	Vomiting	Laxative Use	Diet Pill Use	Binge Eating	Frequency Criterion Used	AN Diagnosis	BN Diagnosis	BED Diagnosis	Combined ED Diagnosis
Self-report data															
Beekley et al. (2009)	1,455	95% 18–22	Cadets	Not reported	20.5% (mean)	EAT-26	–	–	–	–	–	–	–	–	–
Garber et al. (2008)	1,985	19 ± 2.1	Recruits	(18.5–21.9)	–	–	25% (vomiting, pills, binging)				Not reported	–	–	–	–
Jacobson et al. (2009)	12,641	(<20–40+)	Active duty	Not reported	–	Survey-based diagnose	–	–	–	–	–	–	–	–	5.5% (baseline); 3.3% (new onset)
Lauder et al. (1999)	423	27.5 ± 7.7	Active duty	23.5 ± 3.13 (16.3–42.6)	33.6%	EDI	–	–	–	–	–	–	–	–	–
Lauder and Campbell (2001)	310	21.5 ± 1.9	Cadets	22.72 ± 0.3 (18.1–33.3)	20%	EDI	5.2%	3.9%	14.5	8.7%	≥1 X per month in last 3 months or ≥2x per week at worst point in last 2 years	–	–	–	–
McNulty (1997b)	706	21–58	Active duty	Not reported	–	*DSM-III-R*	3%	7.1%	8.5%	19.2%	Not reported	1.1%	12.5%	–	–
McNulty (2001)	1,278	18–55	Active duty	Not reported	–	*DSM-IV*	3.3%	9.7%	18%	22%	“During the past few months”	1.8%	8.1%	–	
Warner, Matuszak, Rachal, Flynn, and Grieger (2007)	135	21.03 ± 0.8	Cadets	33% ≥ 25; 1.5% ≥ 30	29.6%	EAT-26	–	–	–	–	–	–	–	–	–
Weighted averages across studies	–	–	–	–	23.3%	–	3.4%	8.3%	14.6%	19.3%	–	1.6%	9.7%	–	–
Interview or two-stage (self-report and interview)															
Beekley et al. (2009)	1,872	18–22	Cadets	Not reported	20.5% (mean)	EAT-26 *DSM-IV*	–	–	–	–	–	0.2%	1.2%	–	–
Forman-Hoffman et al. (2012)	1,004	68% 20–44	Veterans	33.6% BMI ≥ 30	–	Interview	–	–	–	–	–	–	–	–	15.6%

Study	*N*	Age	Sample Type	BMI kg/m^2 (Range)	% at Risk	Measure	Vomiting	Laxative Use	Diet Pill Use	Binge Eating	Frequency Criterion Used	AN Diagnosis	BN Diagnosis	BED Diagnosis	Combined ED Diagnosis
Lauder et al. (1999)	423	27.5 ± 7.7	Active duty	23.5 ± 3.13 (16.3–42.6)	33.6%	EDI *DSM-IV*	–	–	–	–	–	0.2%	0.7%	1.2%	–
Weighted averages across studies	–	–	–	–	23.4%	–	–	–	–	–	–	0.2%	1.1%	1.2%	15.6%
Medical records data															
Antczak and Brininger (2008)	201,607	18–40+	Veterans	Not reported	–	ICD-9	–	–	–	–	–	0.25%	0.79%	–	–
Maguen et al. (2012)	71,248	31 ± 8.9	Veterans	Not reported	–	ICD-9	–	–	–	–	–	–	–	–	0.65%
Striegel-Moore et al. (1999)	24,041	51.4 ± 17.2	Veterans	Not reported	–	ICD-9	–	–	–	–	–	0.04%	0.08%	–	0.3%
Weighted averages across studies												0.22%	.71%	–	0.55%

Note. AN = anorexia nervosa; BED = binge eating disorder; BMI = body mass index; BN = bulimia nervosa; EAT = Eating Attitude Test; ED = eating disorder; EDI = Eating Disorder Inventory. Frequency criterion used refers to the specific criterion used by each study for endorsement of disordered eating behaviors.

Table 2

Eating disorder symptoms and diagnoses in male service members

Study	*N*	Age	Sample Type	BMI kg/m^2 (Range)	% at Risk	Measure	Vomiting	Laxative Use	Diet Pill Use	Binge Eating	Frequency Criterion Used	AN Diagnosis	BN Diagnosis	Combined ED Diagnosis
Self-report														
Jacobson et al. (2009)	33,578		Active duty	Not reported	–		–	–	–	–	–	–	–	6.6%
McNulty (1997a)	1,425	67.7% 18–34	Active duty	Not reported	–	*DSM-IV*	3.7%	3.4%	3.5%	14.0%	Current use	2.5%	6.8%	–
Warner et al. (2007)	955	20.9 ± 3.5	Cadets	37.6% ≥ 25; 4.2% ≥ 30	7%	EAT-26	–	–	–	–	–	–	–	–
Two-stage (self-report and interview)														
Beekley et al. (2009)	10,859	95% 18–22	Cadets	Not reported	2%	–	–	–	–	–	–	0.0%	0.02%	–
Medical records data														
Antczak and Brininger (2008)	1,179,181	18–40+	Veterans	Not reported	–	ICD-9	–	–	–	–	–	0.01 %	0.02%	–
Maguen et al. (2012)	522,491	31 ± 8.9	Veterans	Not reported	–	ICD-9	–	–	–	–	–	–	–	0.04%
Striegel-Moore et al. (1999)	466,590	60.16 ± 14.2	Veterans	Not reported	–	ICD-9	–	–	–	–	–	0.005%	0.004%	0.02%
Weighted averages across studies	–	–	–	–	–	–	–	–	–	–	–	0.008%	0.015%	0.03%

Note. AN = anorexia nervosa; BED = binge eating disorder; BMI = body mass index; BN = bulimia nervosa; EAT = Eating Attitude Test; ED = eating disorder. Frequency criterion used refers to the specific criterion used by each study for endorsement of disordered eating behaviors.

Table 3

Eating disorder symptoms and diagnoses in college and community-based samples of men and women

Study	*N*	Sample Type	Age	BMI	% at Risk	Method	Purging (Vomiting Laxatives Diet Pills)	Binge Eating	Frequency Criterion Used	AN Diagnosis	BN Diagnosis	Combined ED Diagnosis
Self-report												
Forney and Ward (2013)	211 women 65 men	College	20.70 ± 1.40	22.42 ± 3.18 (women) 24.46 ± 3.68 (men)	16.1% (women) 8.5% (men)	Self-report survey	–	–	–	–	–	–
Heatherton et al. (1997)	509 women 206 men	10-year follow-up of college sample	30 ± 2	<10% of sample overweight or obese	–	Self-report survey	1.3%, 0.6%, 1.3% (women: vomiting, laxatives, diet pills) 0.5%, 0%, 0% (men: vomiting, laxatives, diet pills)	12% (women) 9.9% (men)	Current use	–	–	–
Johnson et al. (1999)	562 women 883 men	Collegiate athletes	19.9	21.1 (women) 25.7 (men) ~12% BMI ≥ 30	25–58% (women) 9.5–38% (men)	Self-report survey	5.2% (women) 2.04% (men)	8.36% (women) 8.6% (men) *loss of control not included	≥1 x per week over past 3 months	0% (women and men)	1.1% (women) 0% (men)	–
Keel and Heatherton (2010)	968 women 369 men	10-year follow-up of college sample	30 ± 2	22.45 ± 3.61 (women) 24.44 ± 2.88 (men)	–	Self-report survey	–	–	–	–		5% (women) 3% (men)
Keel et al. (2006)	548 women 244 men	College	20 ± 1.6	22.5 ± 3.1	–	Self-report survey	4.3% (women) 0% (men)	14.8% (women) 3.8% (men)	Current use	–	–	11.7% (women) 1.8% (men)
Klemchuk et al. (1990)	1,506 women	College	17–31	Not reported	10.1%	Self-report survey	–	–	–	–	–	–
Weighted averages across studies	–	–	–	–	22.47% (women) 35.86% (men)	–	4.2% (women) 1.43% (men)	11.67% (women) 7.88% (men)	–	–	–	7.39% (women) 2.45% (men)
Medical records data												

Study	*N*	Sample Type	Age	BMI	% at Risk	Method	Purging (Vomiting Laxatives Diet Pills)	Binge Eating	Frequency Criterion Used	AN Diagnosis	BN Diagnosis	Combined ED Diagnosis
Striegel-Moore et al. (2008)	101,130 women 93,628 men	Medical records data	18–55	Not reported	–	ICD-9	–	–	–	0.02% (women)	0.07% (women)	0.32% (women) 0.02% (men)

Note. AN = anorexia nervosa; BMI = body mass index; BN = bulimia nervosa; ED = eating disorder. Frequency criterion used refers to the specific criterion used by each study for endorsement of disordered eating behaviors. *Loss of control criterion for binge eating was not assessed/included in definition of binge eating in this sample.

Suicide and Life-Threatening BEHAVIOR
THE OFFICIAL JOURNAL OF THE AMERICAN ASSOCIATION OF SUICIDOLOGY

Published 2014. This article is a U.S. Government work and is in the public domain in the USA
DOI: 10.1111/sltb.12103

A Virtual Hope Box Smartphone App as an Accessory to Therapy: Proof-of-Concept in a Clinical Sample of Veterans

Nigel E. Bush, PhD, Steven K. Dobscha, MD, Rosa Crumpton, RN, Lauren M. Denneson, PhD, Julia E. Hoffman, PhD, Aysha Crain, MSW CSWA, Risa Cromer, MPhil, and Julie T. Kinn, PhD

A "Hope Box" is a therapeutic tool employed by clinicians with patients who are having difficulty coping with negative thoughts and stress, including patients who may be at risk of suicide or nonsuicidal self-harm. We conducted a proof-of-concept test of a "Virtual" Hope Box (VHB)—a smartphone app that delivers patient-tailored coping tools. Compared with a conventional hope box integrated into VA behavioral health treatment, high-risk patients and their clinicians used the VHB more regularly and found the VHB beneficial, useful, easy to set up, and said they were likely to use the VHB in the future and recommend the VHB to peers.

BACKGROUND

Military Suicides

Since the beginning of combat operations in Iraq (Operation Iraqi Freedom, OIF) and Afghanistan (Operation Enduring Freedom, OEF), an upward trend of suicidal behavior among service members has emerged (Luxton et al., 2011). Psychologic disorders, including major depressive disorder and posttraumatic stress disorder (PTSD), have been widely related to suicidal behavior (Luxton et al., 2011; Oldham, 2008) as have deployments to war zones and exposure to combat (Fontana & Rosenheck, 1994; Selby et al., 2010). Traumatic brain injuries, often resulting from blast injuries occurring

Nigel E. Bush, U.S. Department of Defense, National Center for Telehealth and Technology |T2|, Tacoma, WA, USA; Steven K. Dobscha, , Portland Center to Improve Veteran Involvement in Care (CIVIC), Portland Veterans Affairs Medical Center, Portland, OR, USA and , Department of Psychiatry, Oregon Health & Science University, Portland, OR, USA; Rosa Crumpton, U.S. Department of Defense, National Center for Telehealth and Technology |T2|, Tacoma, WA, USA; Lauren M. Denneson, Portland Center to Improve Veteran Involvement in Care (CIVIC), Portland Veterans Affairs Medical Center, Portland, OR, USA and , Department of Psychiatry, Oregon Health & Science University, Portland, OR, USA; Julia E. Hoffman, National Center for PTSD, VA Palo Alto Health Care System, Palo Alto, CA, USA; Aysha Crain and Risa Cromer, Portland Center to Improve Veteran Involvement in Care (CIVIC), Portland Veterans Affairs Medical Center, Portland, OR, USA; Julie T. Kinn, U.S. Department of Defense, National Center for Telehealth and Technology |T2|, Tacoma, WA, USA.

The views expressed are those of the authors and do not reflect the official policy of the Department of Defense or the U.S. Government. This work was in part supported by the Military Suicide Research Consortium (MSRC), an effort supported by the Office of the Assistant Secretary of Defense for Health Affairs under Award No. W81XWH-10-2-0178. Opinions, interpretations, conclusions and recommendations are those of the authors and are not necessarily endorsed by the MSRC or the Department of Defense.

Address correspondence to Nigel Bush, National Center for Telehealth and Technology |T2|, 9933 West Hayes Street, OMAMC, Joint Base Lewis-McChord, Tacoma, WA 98431; E-mail: nigel.e.bush.civ@mail.mil

during deployment, are also of increasing concern for suicidal behavior (Brenner, Homaifar, Adler, Wolfman, & Kemp, 2009).

Treatment for Suicidality

Cognitive-behavioral-based therapeutic approaches, including cognitive therapy (CT; Beck, 2005) and dialectical behavior therapy (DBT; Linehan, 1993; Linehan, Comtois, Brown, Heard, & Wagner, 2006), have demonstrated utility in identifying and managing suicidal thoughts and related behaviors (Brenner et al., 2009; Brown et al., 2005). CT has been applied to the treatment of suicidal behavior by teaching patients cognitive and behavioral techniques designed to provide coping strategies for when they are experiencing suicidal ideation (Berk, Henriques, Warman, Brown, & Beck, 2004; Brown, Henriques, Ratto, & Beck, 2002; Brown et al., 2005). DBT therapeutic components include behavioral and problem-solving strategies and distress tolerance skills, as well as acceptance-based strategies.

Identifying Reasons for Living—The Hope Box

Improving emotional regulation and distress tolerance during episodes of significant distress is an important component of CT and DBT for suicidal patients. During such periods, suicidal patients are able to cite reasons for wanting to die, and often find it challenging to access reasons for living (Wenzel, Brown, & Beck, 2009). Through the identification and affirmation of reasons for living (e.g., children, pets, loved ones), suicidal patients are able to mitigate suicidal thoughts. Although skilled clinicians are able to elicit reasons for living from patients experiencing suicidal thoughts during treatment sessions, patients may find it difficult to recall reasons for living outside of treatment. To support face-to-face therapy away from the clinic, the CT or DBT clinician often will implement a physical "hope kit" or "hope box" with the patient (Berk, Grosjean, & Warnick, 2009; Wenzel et al., 2009). This therapeutic intervention is not a standalone tool, but rather an integral component of CT and DBT, which has been shown to reduce suicidal thoughts and behaviors (Brown et al., 2005; Kliem, Kroger, & Kosfelder, 2010). A hope box is a physical representation of the patient's reasons for living that the patient creates and customizes with provider guidance. Specific items included in an individual's hope box necessarily vary from patient to patient but typically encompass a core of essential elements: reminders of previous successes, positive life experiences, existing coping resources, and current reasons for living (Ghahramanlou-Holloway, Cox, & Greene, 2012). For example, a patient might store in a designated hope box items such as a favorite music CD, a worry stone, family photographs, letters, or reminders of accomplishments, and future aspirations. The purpose of the hope box is to provide a means of recalling their reasons for living during periods of significant distress and discouragement when they may be susceptive to suicidal thinking. Certain elements of the hope box can also serve as resources to use for distraction with the goal of bolstering stress tolerance skills. The behavioral health provider supports the patient in constructing and customizing a hope box and encourages the patient to access it as needed to mitigate feelings of hopelessness.

"*Virtual*" *Hope Box*

While the conventional hope box has shown utility in clinical practice, it has limitations. A collection of personalized items in (for example) a shoe box or bag can be physically unwieldy and inconvenient and often not easily available or privately accessible when a patient needs it most during crises. Mobile devices, such as smartphones, are carried regularly by many service members (Bush, Fullerton, Crumpton, Metzger-Abamukong, & Fantelli, 2012), and the adoption of handheld technologies for use

in psychologic health care is rapidly on the rise (Ly, Carlbring, & Andersson, 2012). Elements of behavioral health care delivered via a patient's personal smartphone can expand the reach of traditional therapeutic interventions beyond the clinic. This is especially critical for individuals who can be emotionally sensitive and/or engaged in suicidal thinking because crises are most likely to emerge in the absence of health care providers. To improve portability and availability during distress, we developed a "Virtual Hope Box" (VHB) for service members and veterans, expanding the reach of the hope box modality to a smartphone app. In this article, we present our findings from a proof-of-concept evaluation of the prototype VHB in a large regional Veterans Administration (VA) behavioral health clinic. Our research questions were: (1) Can a smartphone app be developed that contains the essential elements of a hope box and associated elements of CT/DBT in a package acceptable to and usable by military service members and veterans? and (2) Is the VHB app as usable, acceptable, convenient, and ostensibly useful as a conventional hope box to a clinical sample of service veterans at high risk of self-harm and suicide, and their providers?

METHODS

Our study comprised two phases: (1) initial VHB design and development and (2) clinical field testing. All study procedures were approved by the local VA internal review board and the Army Human Research Protection Office.

Prototype Development

VHB concept, design, development, and initial testing were conducted by study team members from the Department of Defense National Center for Telehealth and Technology (T2; National Center for Telehealth & Technology, 2014). We first determined the content and functionality of the prototype VHB by combining evidence from the literature with input from subject matter experts and mobile-technology specialists. We next translated our VHB design specifications into a working prototype application. During our minimal risk, "agile" development process (The Agile Alliance, 2014), we performed iterative and incremental usability tests of developing features and components. Lastly, we conducted formal in-depth usability testing of the prototype with 10 active duty soldiers drawn from a large military installation and made final changes to the VHB based on their feedback.

Clinical Field Testing

Setting and Sample. Clinical proof-of-concept testing was conducted by clinicians in the DBT program at a large VA medical center. At least 50 DBT patients are exposed to a conventional hope box (CHB) intervention per year at the clinic. Study participants were 18 high-risk-of-self-harm veterans enrolled in DBT who had borderline personality disorder, bipolar disorder, treatment refractory depression, or PTSD. Additional study eligibility criteria included (1) ownership and regular use of a personal iPhone or Android phone and (2) identified by their clinicians as clinically suitable for hope box utilization as part of treatment. Participating clinicians were six clinical social workers and one clinical psychologist, with a mean 7.9 years (range 1–16 years) in practice.

Design. Our study was primarily descriptive at the case level, within which we employed a cross-over, counterbalanced design, in which all selected patients tested both personalized CHBs and VHBs consecutively, with order of use randomized to a defined outcome of equal cell sizes.

Intervention—VHB. The prototype VHB smartphone app tested in this study contained six primary sections designed to collectively provide support, comfort, distraction, or relaxation by using audio, video, pictures, games, mindfulness exercises,

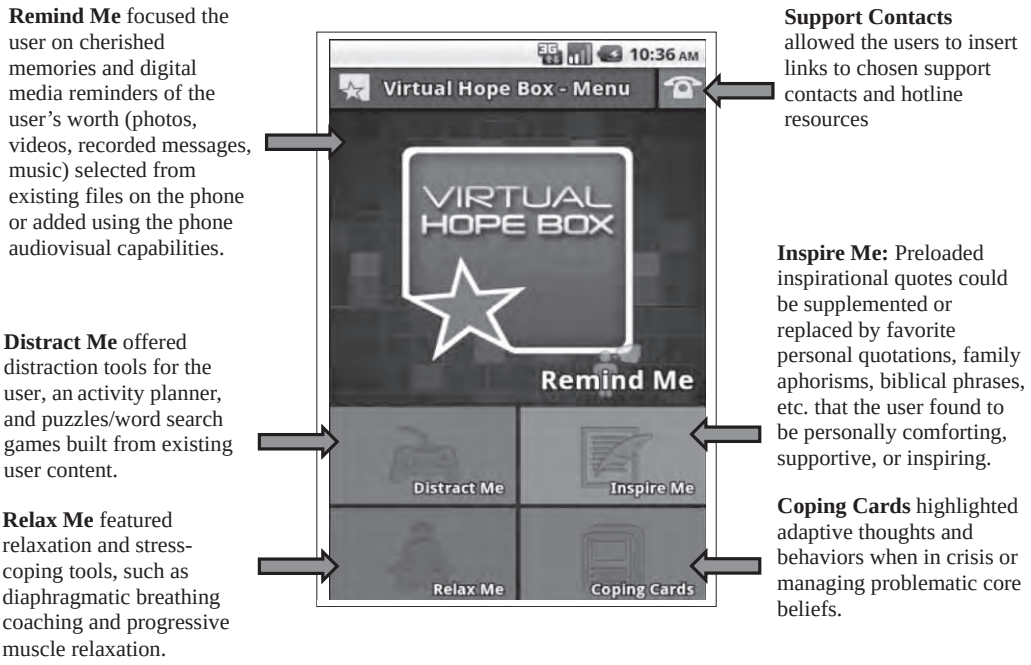


Figure 1. Annotated schematic of VHB prototype screen layout and primary section content.

messages, inspirational quotes, coping statements, and other media content (see Figure 1). The intent was for a provider to work with a patient to populate the sections according to the patient's individual needs.

Procedures. Patients were referred by individual DBT providers. Each eligible and willing participant was consented and enrolled by the study research coordinator and then randomized to receive either the CHB or VHB first. For the CHB condition, participants met with their clinician for an instruction session in which the clinician guided them through the principles and methods of hope box construction. Patients were asked to begin to create their personal CHB. At their next scheduled clinic sessions, CHBs were reviewed by the clinicians and guidance for further development and use was offered. Patients used the CHB for 6 to 8 weeks and then returned to the clinic to evaluate their experience with the CHB. Procedures for the VHB condition were similar. The VHB app was introduced and downloaded to the patients' smartphones, with instruction on hope box construction. Patients personalized their VHB at home and in the clinic with clinician guidance, used the app for 6 to 8 weeks with more personalization made by the patients if they chose, and then returned to the clinic to participate in an evaluation.

Measures

Pre-Testing (baseline). Immediately following enrollment in the clinic, patients completed a personal and service demographics background questionnaire followed by a technology use questionnaire, which indexed familiarity, experience, and proficiency with personal technology, computers, the Internet, and cellphone/smartphone/apps.

Testing (VHB–CHB use away from the clinic). During each of the home testing periods of the VHB and CHB, respectively, patients were contacted by phone every 2 weeks by study staff. Using a semistructured interview, staff inquired about fre-

quency of CHB or VHB use during the prior 2 weeks, how it was actually used (i.e., which components), purpose of use, and whether that goal was achieved.

Post-Testing. After testing each of the two types of hope boxes, patients returned to the clinic to evaluate that version by self-report questionnaire. Each patient was systematically queried on the layout, interface, display/appearance, and each key component of the respective hope boxes for (1) frequency of use; (2) ease of use; (3) functionality; (4) understandability; (5) overall impression; (6) recommendations for future modifications; (7) likelihood to use again; and (8) error and technical difficulties (VHB only), employing a combination of Likert-type rating scales (e.g., 1—*very difficult*, 2—*somewhat difficult*," "3—*neither difficult nor easy*, 4—*somewhat easy*, and 5—*very easy*) and open-ended questions. An additional post-testing evaluation asked patients to compare the CHB with the VHB for preferences.

Electronic Usage Logs. Detailed use of the VHB was recorded internally on patient smartphones as usage logs, which were downloaded during the post-test evaluation phase and transmitted to the T2 group in a manner that did not disclose personally identifying information.

Patient Debrief. At the end of data collection, we conducted semistructured interviews with study patients asking them to compare their experiences using the CHB and the VHB (e.g., Did patients have a preference? What were barriers or facilitators regarding one in comparison with the other?).

Clinician Debrief. Finally, we conducted semistructured interviews with participating clinicians asking them about their experiences and perceptions using the CHB and the VHB with their patients as part of clinical practice.

Analysis. We analyzed objective electronic VHB usage logs from patient smartphones and subjective quantitative survey data from Likert-type scales, and qualitative data from open-ended survey questions and interviews. Our analyses were primarily descriptive.

RESULTS

Sample

We approached 23 DBT clinic patients to participate. Of 20 eligible candidates, one declined to participate and one dropped out (moved away) after enrollment.

Our final sample included 18 patients with a mean age of 41.4 years (range 28–56, DS = 8.6) and a broad array of educational levels (GED/HD = 2, some college = 8, AA/Tech degree = 4, bachelor's degree = 4). Fourteen patients identified as White/Caucasian, 10 patients were female, and 8 were male. Patients were veterans of Air Force (n = 3), Army (n = 8), Marine Corps (n = 1), Navy (n = 5), and Coast Guard (n = 1). All but one patient (O1–O5) were formerly of enlisted rank (E1–E4 n = 11, E5–E9 n = 6). Nine had no history of military deployment to a war zone; the remainder had served variously in Operation Desert Storm, Operation Iraqi Freedom, Operation Enduring Freedom (Afghanistan), Vietnam, and other locations. Diagnoses at the time of enrollment encompassed combinations of PTSD, depression, bipolar disorder, borderline personality disorder, and mood disorder, some with co-occurring alcohol or opioid dependency. Participants judged themselves to be relatively experienced smartphone users, with nearly 80% using a smartphone for six or more hours a week. Type of personal phone used for the VHB was divided evenly between iPhone and Android.

Electronic VHB Usage Logs

Electronic logs received from patients' phones were available for 17 of the 18 patients. Across 17 patients, VHB was used on an average of one or more times per day on more than 13 separate days away from

the clinic—ranging from a minimum of 4 different days to as many as 43 different days. Duration of VHB use amounted to an average of more than 1 hour of total individual use for 14 of 17 patients. The remaining three patients showed exceptional commitment to daily use of the VHB, averaging 26 total hours of VHB use. Almost all patients used the VHB either intermittently or regularly across several weeks away from the clinic (88% of patients >2 weeks, 76% >4 weeks, 59% >6 weeks). The most frequently used sections of the VHB over all patients were "Distract Me" (38% of total "hits"), "Remind Me" (28%), and "Inspire Me" (13%). After the initial VHB setup in the clinic, patients added a variety of personalized media to their VHBs to fit their needs over time, as was encouraged. Substantial numbers of photographs (483 among 17 patients), inspirational quotes (328), music files (184), and, to a lesser extent, contacts (74) were added by patients to their VHBs away from the clinic. Forty new coping cards also were created by patients after initial clinic setup with the provider.

Patient Self-Assessments

Figure 2 compares assessments of key postuse measures of the VHB and CHB. Although both VHB and CHB were popular across the board, patients used the VHB more and rated it more highly than the CHB. Furthermore, half the patients (n = 9) said they would prefer the VHB over the CHB for future use, while only four of the 18 preferred the CHB. Interestingly, the remaining four said they would choose to use both the VHB and CHB in combination (one patient had no preference). When asked which type of hope box they would recommend to a fellow veteran in need, none of the patients said they would recommend the CHB alone, while 7 (39%) would recommend the VHB alone. The majority (n = 11) would recommend the VHB and CHB in combination.

Patient Feedback about VHB

Answers to open-ended general questions about the VHB were voluminous and almost unanimously positive: Patients who

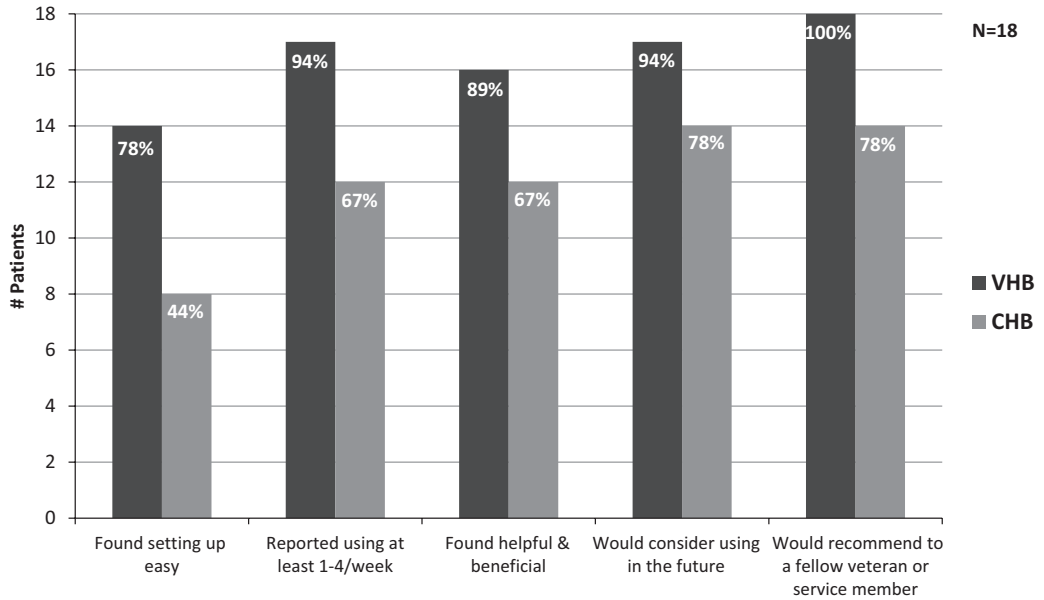


Figure 2. Post-use usability questionnaire patient self-report.

preferred the VHB commented that they found the VHB "more convenient," "more private," "more portable," "more accessible and easier to put together," "more options," "easier to remember to use," "with me all the time," and "more effective." The four patients who preferred the CHB said they found it "more tangible," "more personalized," "more options," and "want to be able to physically touch." Additional comments included:

- "Helped numb away from distress";
- "[Inspirational] Quotes helped turn a negative self-image into a positive self-talk";
- "Keeps me grounded, there are options at what to look at, made it very personal";
- "Helped manage distress at work when having memory issues";
- "Controlled breathing helps me to relax. Pictures remind me that I have a reason to stay on the earth";
- "[Inspirational] Quotes keep me thinking about who I am and gave me positive messages";
- "Coping cards reminded me that it is okay to not be perfect";
- "Helped to soothe when thought about cutting";
- "Was distracting until felt better";
- "Helped manage PTSD symptoms like hyper-vigilance";
- "Wouldn't want to get rid of it";
- "It is soothing and prevents me from doing things like yelling at people in line, used box instead to distract self."

Clinician Feedback

Participating providers were also highly complementary about their experiences using the VHB in their clinical practices. The following were among many illustrative provider statements of VHB as an accessory to therapy.

- "I find the VHB to be a great tool for completing, working, collaborating with a client, actively, in session. When I find that the focus of a session turns to themes of I can't do anything; nothing will work; I won't do that, this tool enables collaboration to happen."
- "[Patients] liked the accessibility, ability to use discretely—they might use in line when waiting or in anxiety provoking situations, [and] liked the privacy. VHB is easy to set up, also still very personalized too."
- "In my experience in working with those in DBT, a lot of clients skip over the [conventional] hope box. They must think, 'How would I use this at home?' or 'Would it be in my car?' or 'I can't take this with me on the bus.' Using the VHB became a part of every session: building Coping Cards, filling the app with photos and music, and [discussion of] utilizing the app—whether or not they used it and if they found it helpful. The two people I'm thinking of are still using the app, so it's been part of every session —which, in my experience in DBT, I can't say the same about the physical hope box. I haven't found that to be as effective or interactive."
- "I think it's great, super easy to use. I show it to all the clients I work with, even the non-DBT clients, to show them the range of other apps they can use. There's nothing I didn't like. I found it to be really, really easy to use, remarkably so."
- "The biggest thing I did [with patients] was Coping Cards. It was very powerful to observe and describe their negative statements which were hard to identify as beliefs because they seemed so true. That was a powerful intervention to have those discussions about beliefs vs. truths. Writing the challenges was easier then."
- "I think VHB could be used both therapeutically or more generalized to other vets. I found it seemed

beneficial to those who used it and were engaged with it, not just those with suicidal ideation—good for distress tolerance in general."

- "Lots of disorders could benefit, like PTSD, depression, anxiety—it could be generalizable therapeutically. It's not so specific that it only works for certain disorders."

Modifications to VHB Based on User Feedback

The bulk of our post-use assessment questionnaire and interview items were devoted to fine-detail review by patients of every specific component (e.g., "Remind Me" section) and subcomponent (e.g., separate reviews of "Remind Me" videos, photographs, recorded messages, and music) of the prototype VHB, including recommendations for modifications and improvement. We also administered equally comprehensive clinician reviews of the VHB in clinical use. In total, we compiled more than 80 pages of feedback that informed our subsequent modifications to the operational VHB app for release to the public marketplace. Detailed descriptions of these data are beyond the scope of this article, but beyond improving functional reliability and ease of use throughout, the most notable modification was our addition to the Relax Me section of three new guided imagery relaxation tools to supplement breathing and muscle relaxation tools. At the request of providers, we also created detailed downloadable user guides for clinicians and patients.

DISCUSSION

We believe the results of this study show the VHB to have great promise as a therapeutic tool for behavioral health providers. Compared with the conventional hope box, more patients (1) used the VHB regularly; (2) found the VHB beneficial and helpful; (3) found the VHB easy to set up; (4) said they were likely to use the VHB in the future; and (5) would recommend the VHB to peers. Twice as many patients preferred the VHB for future use than the CHB. Written comments from patients further extolled the benefits of the app in its intended use; patients cited the helpfulness of VHB with managing distress, negativity, hopelessness, anger, and various other symptoms. We were especially encouraged by the positive experiences of behavioral health clinicians who were unanimous in their praise for the VHB as an eminently usable therapeutic tool.

While the VHB clearly was popular with patients and providers, a few limitations were evident. Perhaps most important was the inability of the electronic medium to offer a complete sensory experience. Patients highlighted the texture and smell of objects in their CHBs as especially tangible and evocative positive reinforcers and self-soothing aids. Ultimately, a majority of participants suggested (and we concur) that using the VHB and CHB in combination would provide the best of both worlds: that the palpably physical but unwieldy items in a CHB would ideally be complemented by the highly accessible and media-rich content of a VHB. More generally, as preliminary proof-of-concept of the VHB potential in a clinical population, this study was limited by small sample size and entirely descriptive analyses. We know that the VHB was used and liked, but we do not know whether measurable changes in coping and positive thinking resulted. The next step will be to conduct a larger-scale clinical trial comparing changes in outcomes of interest between the VHB and treatment as usual, and in fact, we have recently embarked on such a study.

CONCLUSION

Portable personal technologies already are ubiquitous and increasingly are being employed as part of behavioral health (Depp et al., 2010). While a smartphone app may not be a substitute for in-person care, it does have the advantage of 24/7 accessibility for when that care is not

available. We believe that the virtual hope box smartphone app offers clinicians and their patients a valuable tool to supplement face-to-face treatment for stress and negative thinking.

REFERENCES

BECK, A. T. (2005). The current state of cognitive therapy: A 40-year retrospective. *Archives of General Psychiatry*, *62*, 953–959. doi:10.1001/archpsyc.62.9.953.

BERK, M. S., GROSJEAN, M., & WARNICK, H. D. (2009). Beyond threats: Risk factors for suicide in borderline personality disorder. *Current Psychiatry*, *8*, 32–41.

BERK, M. S., HENRIQUES, G. R., WARMAN, D. M., BROWN, G. K., & BECK, A. T. (2004). A cognitive therapy intervention for suicide attempters: An overview of the treatment and case examples. *Cognitive and Behavioral Practice*, *11*, 265–277.

BRENNER, L. A., HOMAIFAR, B. Y., ADLER, L. E., WOLFMAN, J. H., & KEMP, J. (2009). Suicidality and veterans with a history of traumatic brain injury: Precipitants events, protective factors, and prevention strategies. *Rehabilitation Psychology*, *54*, 390–397.

BROWN, G. K., HENRIQUES, G. R., RATTO, C., & BECK, A. T. (2002). *Cognitive therapy treatment manual for suicide attempters*. Philadelphia, PA: University of Pennsylvania.

BROWN, G. K., TEN HAVE, T., HENRIQUES, G. R., XIE, S. X., HOLLANDER, J. E., & BECK, A. T. (2005). Cognitive therapy for the prevention of suicide attempts: A randomized controlled trial. *JAMA*, *294*, 563–570. doi:10.1001/jama.294.5.563.

BUSH, N. E., FULLERTON, N., CRUMPTON, R., METZGER-ABAMUKONG, M., & FANTELLI, E. (2012). Soldiers' personal technologies on deployment and at home. *Telemedicine Journal and E-Health*, *18*, 253–263. doi:10.1089/tmj.2011.0131.

DEPP, C. A., MAUSBACH, B., GRANHOLM, E., CARDENAS, V., BEN-ZEEV, D., PATTERSON, T. L., ET AL. (2010). Mobile interventions for severe mental illness: Design and preliminary data from three approaches. *The Journal of Nervous and Mental Disease*, *198*, 715–721. doi:10.1097/NMD.0b013e3181f49ea300005053-201010000-00003.

FONTANA, A., & ROSENHECK, R. (1994). Traumatic war stressors and psychiatric symptoms among World War II, Korean, and Vietnam war veterans. *Psychology and Aging*, *9*(1), 27–33.

GHAHRAMANLOU-HOLLOWAY, M., COX, D. W., & GREENE, F. N. (2012). Post-admission cognitive therapy: A brief intervention for psychiatric inpatients admitted after a suicide attempt. *Cognitive and Behavioral Practice*, *19*, 233–244. doi:10.1016/j.cbpra.2010.11.006.

KLIEM, S., KROGER, C., & KOSFELDER, J. (2010). Dialectical behavior therapy for borderline personality disorder: A meta-analysis using mixed-effects modeling. *Journal of Consulting and Clinical Psychology*, *78*, 936–951. doi:10.1037/a0021015.

LINEHAN, M. (1993). *Cognitive-behavioral treatment of borderline personality disorder*. New York: Guildford Press.

LINEHAN, M. M., COMTOIS, K. A., BROWN, M. Z., HEARD, H. L., & WAGNER, A. (2006). Suicide Attempt Self-Injury Interview (SASII): Development, reliability, and validity of a scale to assess suicide attempts and intentional self-injury. *Psychological Assessment*, *18*, 303–312. doi:10.1037/1040-3590.18.3.303.

LUXTON, D. D., OSENBACH, J. E., REGER, M. A., SMOLENSKI, D. J., SKOPP, N. A., BUSH, N. E., ET AL. (2011). *Department of Defense Suicide Event Report (DoDSER): Calendar year 2011 annual report*. Tacoma, WA: National Center for Telehealth & Technology, Defense Centers of Excellence for Psychological Health & TBI (DCOE).

LY, K. H., CARLBRING, P., & ANDERSSON, G. (2012). Behavioral activation-based guided self-help treatment administered through a smartphone application: Study protocol for a randomized controlled trial. *Trials*, *13*, 62. doi:10.1186/1745-6215-13-62.

OLDHAM, J. (2008). PTSD and Suicide. *Journal of Psychiatric Practice*, *14*(4), 195.

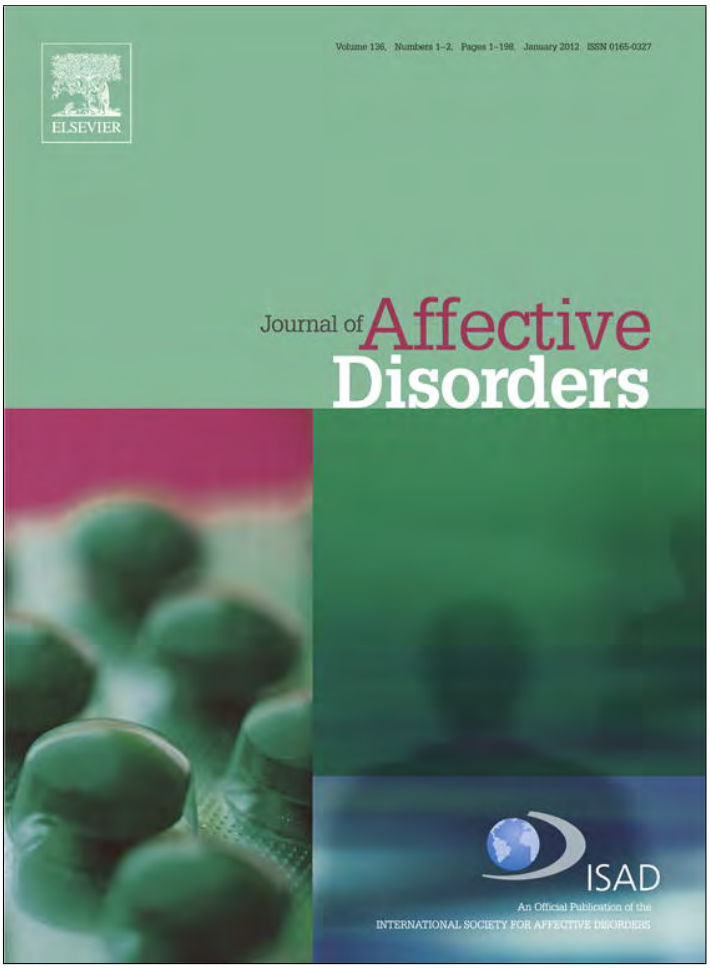
SELBY, E. A., ANESTIS, M. D., BENDER, T. W., RIBEIRO, J. D., NOCK, M. K., RUDD, M. D., ET AL. (2010). Overcoming the fear of lethal injury: Evaluating suicidal behavior in the military through the lens of the interpersonal-psychological theory of suicide. *Clinical Psychology Review*, *30*, 298–307.

The Agile Alliance. (2014). Retrieved April 19, 2011, from http://www.agilealliance.org/

The National Center for Telehealth and Technology. (2014). Retrieved January 29, 2014, from http://www.t2.health.mil/

WENZEL, A., BROWN, G. K., & BECK, A. T. (2009). *Cognitive therapy for suicidal patients: Scientific and clinical applications*. Washington DC: American Psychological Society.

Manuscript Received: February 11, 2014
Revision Accepted: March 4, 2014



Journal of Affective Disorders 179 (2015) 82–87

Contents lists available at ScienceDirect

Journal of Affective Disorders

journal homepage: www.elsevier.com/locate/jad

Research report

Veteran exposure to suicide: Prevalence and correlates

Julie Cerel [a,*], Judy G. van de Venne [a], Melinda M. Moore [b], Myfanwy J. Maple [c], Chris Flaherty [a], Margaret M. Brown [d]

[a] College of Social Work, University of Kentucky, Lexington, KY, USA
[b] Department of Psychology, Eastern Kentucky University, Richmond, KY, USA
[c] School of Health, University of New England, Armidale, Australia
[d] UK College of Public Health, Department of Epidemiology University of Kentucky, Lexington, KY, USA

ARTICLE INFO

Article history:
Received 10 March 2015
Accepted 12 March 2015
Available online 21 March 2015

Keywords:
Suicide
Exposure
Veteran

ABSTRACT

Background: The aim of this study was to determine rates and consequences of suicide exposure in a veteran population and variables related to psychiatric morbidity.
Methods: 931 veterans from a random digit dial survey conducted July 2012–June 2013 in the Commonwealth of Kentucky was utilized to examine associations between suicide exposure and depression and anxiety. For those with lifetime suicide exposure, perceptions of closeness to the decedent and additional traumatic death exposure were also examined.
Results: Almost half of veterans (47.1%, $n=434$) reported lifetime exposure to suicide. Suicide-exposed individuals were almost twice as likely to have diagnosable depression (OR=1.92, CI=1.31–2.8) and more than twice as likely to have diagnosable anxiety (OR=2.37, CI=1.55–3.61). Suicide-exposed were also more likely than non-exposed to report suicide ideation (9.9% vs. 4.3%). Perceived closeness to decedent increased the odds of depression (OR=1.38, CI=1.12–1.69), anxiety (OR=1.51, CI=1.21–1.89) and PTSD (OR=1.65, CI=1.27–2.16) and more than doubled the odds of Prolonged Grief (OR=2.47, CI=1.60–3.83). A model examined time sequence of suicide and traumatic death exposure. Experiencing a suicide exposure first and subsequent traumatic death exposure in their military career almost quadrupled the odds of suicide ideation (OR=3.56, $p=.01$, CI=1.34–9.46).
Limitations: Major study limitations include use of only one US state and random digit dial response rate.
Conclusions: Suicide exposure confers psychiatric risks in veterans. Perceptions of closeness to decedents, which may extend beyond familial lines, may heighten these risks in the suicide exposed. Multiple exposures to suicide and traumatic death may lead to significant suicide risk.

1. Introduction

Approximately 22 veterans die by suicide daily in the United States and suicide remains a critical problem in the United States military, despite the focus on suicide prevention within the U.S. Armed Forces and Department of Veterans Affairs (Kirsch, 2014). Recent investigations into the effects of war on suicide rates have focused on the impact of multiple deployments, traumatic brain injury, and combat exposure (Bryan and Clemans, 2013; Bryan et al., 2013). While military service has historically been associated through various eras with psychiatric disorders, such as post traumatic stress disorder (PTSD) due to exposure to sudden and traumatic death caused by combat and training accidents (Kessler et al., 2014; Nock et al., 2014; Schoenbaum et al., 2014), none of these recent investigations have examined the impact made by the exposure to suicide.

Suicide rates among veterans remain well above the civilian rate and, while veterans represent 1% of the U.S. population, they represent 20% of all suicide deaths every year (Department of Veteran Affairs, 2010). These findings are especially salient in light of recent trends for rising suicide rates among U.S. military personnel. The suicide rates for Army and Marine personnel who served in Iraq and Afghanistan more than doubled from 2005 to 2009 and for those who never deployed the suicide rate tripled (Hoge and Castro, 2012). By 2012, the number of Army soldiers dying by suicide each year exceeded the number killed in action.

Military service members deployed to combat zones necessarily experience trauma related to their service which frequently results in poor mental health outcomes, such as PTSD, depression, and anxiety. Exposure to combat has been associated with an increased risk of PTSD and the intensity of combat exposure has been linearly related to PTSD symptom severity (Miller et al., 2012). Recent research has pointed to an association between suicidal ideation with certain forms of combat exposure such as dead bodies, body parts, and other atrocities (Boscarino, 2006; Castro and McGurk, 2007; Sareen et al., 2007).

* Correspondence to: University of Kentucky, 627 Patterson Office Tower, Lexington, KY 40506, USA.
E-mail address: julie.cerel@uky.edu (J. Cerel).

http://dx.doi.org/10.1016/j.jad.2015.03.017
0165-0327/

Multiple deployments and long deployments have also demonstrated an adverse impact on mental health outcomes and have been predictive of suicide attempts among military service members (Schoenbaum et al., 2014). Stress on the entire military due to the length of these recent conflicts and the burden placed on all the forces, regardless of deployment status, has been linked to suicide risk among those who were never deployed (Bryan et al., 2013). Other non-combat military-related events, such as exposure to death from training accidents, are expected incidents during military service but are also associated with PTSD, depression, and anxiety disorders (Boscarino, 2006).

Expected military events, such as exposure to traumatic death due to combat-related and training accidents, have been investigated for their association with poor psychiatric outcomes, but exposure to suicide and its effects on health outcomes has yet to be reported. Little is known about the mental and physical health outcomes on service members and veterans from their exposure to suicide death.

Investigations among civilians who are suicide bereaved demonstrate an association with suicide exposure and psychiatric disorders such as PTSD and Prolonged Grief Disorder (PG) (Latham and Prigerson, 2004). Exposure to suicide has also been demonstrated to be predictive of future suicidal ideation and attempts among those exposed to suicide death (Bolton et al., 2013) as well as family members of people who have died by suicide (Pitman et al., 2014).

In our previous investigations, we found that 47% of the overall sample experienced lifetime exposure to suicide (Cerel et al., in press). These included both military veterans and community members who had exposure to suicide. There were no differences between these groups in terms of rates of exposure; however there is a need to investigate how military-specific variables and exposure to sudden traumatic death during their military service are related to the effects of suicide exposure in veterans.

2. Methods

2.1. Sources of data

A random digit dial (RDD) survey was conducted July 2012–June 2013. This study was approved by the university IRB and Department of Defense (DOD)'s Human Research Protection Office (HRPO). A dual frame sample of landline and cell phone numbers were called, weighted to reflect the true distribution of landline only, cell only, and dual use households in the Commonwealth of Kentucky. Respondents were contacted using a modified, list-assisted Mitofsky–Waksberg R method (landline) or a Cellular RDD (cell phone) sampling technique.

As part of a larger study (Cerel et al., in press), 805 non-veterans were also recruited but this analyses only examines the veterans. For the overall study, the Council of American Survey Research Organizations (CASRO) response rate was 35.9%. The CASRO response rate assumes that the proportion of eligible cases in unknown cases is equivalent to the proportion of eligible cases in the sum of cases in the sample of which the eligibility or ineligibility could be determined (CASRO, 1982). Given that homes in which a veteran was not present were asked to participate in the larger study makes us unable to calculate response rates for the veteran-only sample.

Overall, calls to veteran participants averaged 15.20±6.17 min (Range=3.65–74.80). Following oral consent, the respondent was interviewed utilizing the following measures.

3. Independent variables

3.1. Exposure to suicide

Participants were queried as to whether they knew anyone who died by suicide at any point in their lifetime. Those who reported exposure to a suicide death were then asked about perceived closeness of relationship to the decedent (or the death that had most impact on them where multiple exposures were present) on a 5 point Likert scale with higher scores indicating increased closeness. They were asked date of death (to assess for recency of suicide death), social and/or familial relationship to decedent (open-ended), and how many people they knew who had died by suicide (to determine exposure to multiple suicides). Veterans were also asked if the suicide occurred during their military career.

3.2. Demographics

This set of questions included the following: age, race (dichotomized to Caucasian or other race due to the low number of non-Caucasian participants), sex, marital status (married or not married), parental status (having children or not), and rural/urban residence status (with urban being defined as 1–7 and rural being defined as levels 8–9 on the nine-level rural–urban continuum code utilized by the United States Department of Agriculture (USDA) Economic Research Service) (US Department of Agriculture and Economic Research Service, 2012).

3.3. Veteran-specific demographics

This set of questions included the following: military branch, enlisted vs. officer, pay grade upon exiting the military, average duration of membership in armed forces in years, duration in active, reserve, and national guard duty in months and years, whether deployed to combat zone, total number of deployments, total amount of time in combat zone(s) in weeks, months, and years, and month and year of veteran status upon exiting the military.

3.4. Exposure to sudden traumatic death

This dichotomous question asked whether or not participants knew another service member during their military career who had died suddenly and traumatically that was not due to suicide ("During your military career, did you know another service member who died suddenly and traumatically that was not due to suicide like in combat or in a training accident?").

3.5. Dependent variables

3.5.1. Anxiety and depression

The Patient Health Questionnaire (PHQ), anxiety and depression modules, were used to assess depressive and anxiety symptoms (Spitzer et al., 1999). The anxiety module, the PHQ-GAD-7, includes seven questions while the depression module, the PHQ-DEP9, includes nine questions. The PHQ takes less than three minutes per person to administer and has shown good agreement with diagnoses made by independent mental health professionals (κ=.65; overall accuracy, 85%; sensitivity, 75%; specificity, 90%) (Spitzer et al., 1999). A conservative cutoff of 10 on each measure was utilized which indicates moderate symptoms and a probable diagnosis. The prevalence rate from the PHQ of current PHQ depressive disorder in the general population is 9.2% (Martin et al., 2006).

3.6. Post-Traumatic Stress Disorder (PTSD) (for the suicide exposed)

The Short Screening Scale for PTSD is a 7-item measure used to determine PTSD symptoms (Breslau et al., 1999) which was administered to participants who endorsed suicide exposure. Of the seven items, five of the symptoms query about avoidance and numbing and two about hyper-arousal. A score of 4 or greater on this scale defined positive cases of PTSD with a sensitivity of 80% and specificity of 97% (Breslau et al., 1999).

3.7. Prolonged Grief (for suicide exposed)

The Prolonged Grief scale (PG-13) was developed to assess symptoms of grief formerly characterized as "complicated grief." The PG-13 is a 13-item self-report measure that requires 12 responses on a five-point Likert scale and a single item yes/no response. Internal consistency is good (α=.82) with demonstrated predictive and criterion validity (Prigerson et al., 2009). A score of 30 or greater on this scale was used to indicate prolonged grief syndromal status.

3.8. Analysis strategy

All statistical analyses were performed using SPSS (version 20) for Windows (SPSS, 2011). *T*-test and Anovas were used to examine group differences across demographic and military factors as well as mental health scaled outcomes. Chi-square analyses were used to examine associations between independent variables and responses to the dichotomous variables of suicide exposure and mental health diagnosis measures.

Logistic regression analyses were performed to ascertain the effects of suicide exposure on the likelihood that participants had a depression and/or anxiety diagnosis, while controlling for the covariates of age, sex, race, rural/urban status, and two military factors: total years in the armed forces and total length of combat deployment in weeks, which were not highly correlated in bivariate analysis. Demographic and military factors were inserted into the first stage of each analysis followed by insertion of suicide exposure status in the second stage. Response Operator Characteristics (ROC) analyses were conducted to report each model's percentage of variance explained across stages.

4. Results

The phone interview was completed by 931 veterans. Weights were developed to ensure representativeness for phone ownership type (landline phone only, cell phone only, both landline and cell phone) and proportion of male/female (Blumberg et al., 2012).

4.1. Demographics

This sample had a mean weighted age of 61.6 years (SD=15.42, range=20–101) and a median age of 64, the same as the 2010 national veteran population (VA, 2010). The vast majority were male 93.8% (n=837), similar to the national sample of male veterans (93.0%) (VA, 2010). Approximately 90.5% (n=798) of the sample reported their race/ethnicity as White compared to 85% of veterans nationally, 6.7% (n=59) as African American compared to 10.5% of veterans nationally; 1.4% (n=13) as Hispanic compared to 5.0% nationally; .4% (n=3) as Mixed or Multiple race compared to 1% nationally, and .7% as Native American (n=7) compared to .7% nationally. Regarding marital status, 71.6% (n=638) were married. Most (91.1%, n=805) reported living in urban areas.

4.2. Military demographics

Over half of the sample (56.2%, n=524) had served in the Army; 16.0% (n=150) served in the Navy, 16.1% (n=150) in the Air Force, 7.8% (n=73) in the Marines, .7% (n=7) in the Coast Guard, and the remainder in multiple branches (3.1%, n=29). Most veteran participants had served as enlisted personnel (90.6%, n=819), while 9.4% (n=85) had served as officers. Average duration of membership in the armed forces in years was 7.7 years (SD=7.75, Range 1–43 years). Respondents who had served in active duty (n=849) reported a mean of 69.0 months of active duty service (SD=76.02, Range 0–384), reserve respondents (n=97) reported a mean of 80.2 months of service (SD=87.19, Range 0–384), and Reserve Component respondents (n=41) reported a mean of 81.3 months of service (SD=86.80, Range=1–336).

Slightly over half (54.8%, n=505) had not been deployed to combat zones. Those who did deploy reported an average of 2.4 times (SD=4.76; Range=1–30) and spent an average of 62.6 weeks in combat zones (SD=50.74; Range=1–415.7). Three outliers for number of deployments reported 50 deployment times which, according to additional information (total deployment time in weeks), did not seem to be genuine appraisals of the times actually deployed by these soldiers so these were removed from further analyses. Average pay grade (or rank upon exit of military) on a scale of 1 (E1) through 24 (Officer, O9) at completion of military service was 5.77 (SD=3.87, Range=1–20), comparable to a Staff Sergeant (Army/Marines), Technical Sergeant (Air Force), or a Petty Officer 1st Class (Navy/Coast Guard).

4.3. Which veterans report suicide exposure?

Almost half, 47.1% (n=434) of the veteran sample reported lifetime suicide exposure, that is, they knew someone who died by suicide at some point in their life (Cerel et al., in press). We sought to determine if demographics were associated with suicide exposure status in veterans. Suicide exposed respondents were significantly younger ($\bar{x}$=60.03, sd=14.69) than non-exposed ($\bar{x}$=62.88, sd=15.78) respondents ($t(911)=2.81$, p=.01). No other general or military demographics differed between exposed and un-exposed respondents (See Table 1).

Less than half of the veterans (44.7%) reported exposure to other forms of traumatic death during their military career. Of veterans who reported suicide exposure, 53.8% also reported exposure to other forms of traumatic death during their military career.

Closeness scores averaged 3.13±1.44 on a five point scale of 1–5 with 1='Not close' (20.1%), 2 (13.1%), 3='Somewhat close' (24.6%), 4 (18.4%), and 5='Very close' (23.8%). Of the 434 suicide exposed individuals, 64.60% reported they knew more than one person who died by suicide. On average, exposed participants reported they knew almost three people ($\bar{x}$=3.03±4.14, range 1–50) who had died by suicide. Eleven participants (2.4% of the sample) reported exposure to

Table 1
Demographic comparisons between suicide exposed and non-exposed veterans.

Variable	Suicide exposed (n=434)	Suicide non-exposed (n=482)	Test statistic
Age	$\bar{x}$=60.03, sd=14.69	$\bar{x}$=62.88, sd=15.78	t (911)=2.81, p=.005
Sex	90.1% male (n=391)	92.0% male (n=448)	$\chi^2(1)=1.02$; p =.312
Race	92.1% Caucasian (n=396)	89.0% Caucasian (n=427)	$\chi^2(1)=2.578$; p=.108
Marital status	76.2% married (n=330)	73.9% married (n=359)	$\chi^2(1)=.671$; p=.413
Rural/Urban	89.1% urban (n=384)	90.7% urban (n=440)	$\chi^2(1)=.668$; p=.414
Parental status	86.4% have children (n=114)	86.0% have children (n=147)	$\chi^2(1)=.010$;p =.921
Rank	$\bar{x}$=5.95, sd=4.12	$\bar{x}$=5.60, sd=3.64	$t(851)=-.132$, p=.191
Number deployments	$\bar{x}$=.95, sd=2.16	$\bar{x}$=.70, sd=1.49	$t(891)=-2.02$, p=.048
Years of military service	$\bar{x}$=8.13, sd=7.92	$\bar{x}$=7.36, sd=7.40	t (913)=−1.52, p=.129
Enlisted or Officer	90.6% enlisted (n=366)	92.3% enlisted (n=420)	$\chi^2(1)=.808$; p=.369

more than ten suicides. Participants exposed to multiple suicides were asked to determine the death that caused the most impact on them, and in terms of timing of the suicide, on average the death for which the respondent reported the most impact occurred 20.06 years ago (sd = 17.10, range 0–73).

Of the 430 suicide-exposed participants who reported information regarding relationship to the decedent, 69.9% (n = 301) noted the decedent was a non-relative, 11% (n = 47) reported the decedent was a first degree relative, and 19.1% (n = 82) noted the decedent was a less close relative. Almost a quarter (25.4%, n = 109) reported the death occurred during their military career.

4.4. Does exposure to suicide convey psychiatric risk in veterans?

We then sought to examine whether suicide exposure in veterans was associated with psychiatric symptoms. Those who were exposed had significantly higher anxiety means ($\bar{x}$ = 4.70 vs. 3.05, $t(811) = -4.91$, $p \leq .001$,) and depression means ($\bar{x}$ = 5.23 vs. $\bar{x}$ = 3.85, $t(832) = -3.99$, $p \leq .001$). Cut-off scores for probable anxiety were met by 19.3% of suicide exposed compared to 9.4% of suicide unexposed ($\chi^2(1) = 18.60$, $p \leq .001$) and cut-off scores for probable depression were met by 22.5% of suicide exposed compared to 12.5% of suicide unexposed ($\chi^2(1) = 15.12$, $p \leq .001$).

A dichotomous item was created from the single PHQ-Dep suicide ideation item and was used to determine differences in any versus no suicidal ideation in the past two weeks. Participants who reported suicide exposure reported higher rates of suicide ideation than those who reported no exposure (9.9% vs. 4.3%, $\chi^2(1) = 11.01$, $p \leq .01$).

Results of the first regression analysis (see Table 2) revealed that, controlling for demographic and military factors, those who had suicide exposure were almost twice as likely to have a probably depression diagnosis (OR = 1.94, CI 1.32–2.83, $p \leq .001$) and more than twice as likely to have an anxiety diagnosis (OR = 2.39, CI 1.55–3.69, $p \leq .001$). Each stage of both models predicted psychiatric outcomes significantly better than chance.

In the next set of analyses four-stage hierarchical logistic regression analyses were performed on the suicide exposed sub-sample of veterans to ascertain the effects of: demographics (entered into the first stage), recency of the suicide loss, number of suicide exposures (entered into the second stage) perceptions of closeness to the decedent (entered into third stage), and additional traumatic death exposure (entered into the fourth stage) on the likelihood of probable diagnoses of depression, anxiety, PTSD, and prolonged grief status of suicide-exposed veterans. ROC analyses compared variance changes across stages. These analyses, performed, after each stage of the model, reveals the amount of accuracy a model has for discriminating the outcomes of a diagnostic test with the area of 1 (under the curve-AUC) representing an excellent test and.5 representing a failed test. Increasing percentages in AUC reflect increasing discriminatory accuracy of the model and therefore, increased variance that the model correctly explains outcome.

Results of these analyses (see Table 3) revealed that for each incremental change in perceived closeness to the decedent, the odds of depression increased higher than 1 (OR = 1.41 CI = 1.15–1.71, $p \leq .01$), the odds of anxiety and PTSD were almost doubled (OR = 1.51, CI = 1.21–1.89, $p \leq .001$; OR = 1.67, CI = 1.25–2.23, $p \leq .001$, respectively) and the odds of prolonged grief were more than doubled (OR = 2.47, CI = 1.60–3.83, $p \leq .001$).

Each stage for each mental health outcome of depression, anxiety, PTSD, and prolonged grief was predictive significantly better than chance. For 3 out of 4 multi-stage mental health models, the highest percentage of increase in AUC occurred with the addition of perceived closeness in Stage 3 (including a 3% change in AUC for anxiety, 5% change in AUC for PTSD, and 10% change in AUC for prolonged grief).

4.5. Does timing of suicide exposure matter?

A separate, two-stage logistic regression analysis for suicide ideation outcomes was conducted on the group with exposure to both suicide and traumatic death. Demographics were added in the first stage and suicide-traumatic death order in the second stage (see Table 4). This was to determine if suicide ideation odds were increased depending on which of the two events, suicide or traumatic death, occurred first in sequence. Out of 234 veterans with both types of exposure, 194 gave enough information to determine order of events. Results showed that being exposed to suicide prior to being exposed to traumatic death increased the odds of suicide ideation by almost four times (OR = 3.56, p = .01, CI = 1.34–9.46). This model had a non-significant Hosmer and Lemeshow Test for significance (p = .87) signifying a good model fit. Nagelkerke pseudo R-square values increased from.10 to.15 with addition of Suicide-Traumatic Death sequence into the model. The AUC increased from .67 (CI = .56–.79, p = .01) to .75% variance (CI = .63–.86, p = .001) explained by the model with the addition of Suicide-Traumatic Death sequence entered into the model.

Table 2
Odds ratios of probably diagnostic cutoff scores of depression and anxiety for veterans exposed to suicide.

Variable	Odds ratio (95% CI) depression diagnosis	Odds ratio (95% CI) anxiety diagnosis
Suicide exposure*	1.94 (CI 1.32–2.83)[a]	2.39 (CI 1.55–3.69)[a]
ROC area under curve		
Stage 1 (Demographics)	.67 (CI.62–.71)[a]	.72 (CI.67–.76)[a]
Stage 2 (Suicide exposure)	.67 (CI.62-.72)[a]	.73 (CI.68 – .77)[a]
Nagelkerke		
Stage 1 (Demographics)	.06	.11
Stage 2 (Suicide exposure)	.08	.14

NOTE: Covariates inserted in first stage were as follows: Age, Sex, Race, Rural/Urban, Total Years in Armed Forces, Total Length of Combat Deployment in Weeks.

* Suicide exposure inserted in second stage of each model. Coefficients reported here are from final (second) stage of each model.

[a] $p \leq .001$.

5. Discussion

In this first population-based study to examine veteran exposure to suicide, almost half of participants (47.1%) reported exposure to one or more suicide deaths over the course of their lifetime. Overall, demographic variables are not associated with exposure. Like suicide itself, there is not one demographic group disproportionately affected. Younger veterans, however, were slightly more likely to report suicide exposure.

Exposure to suicide almost doubled the likelihood of depression diagnoses and more than doubled the likelihood of anxiety diagnoses. Furthermore, our analyses on the suicide exposed sub-sample revealed slight increased odds for meeting depression diagnosis criteria, almost doubled odds for meeting anxiety and PTSD diagnosis criteria, and more than doubled odds for meeting prolonged grief diagnosis criteria for each level of increase (up to 5 levels) in perceived closeness to the suicide decedent.

Rates of suicidal ideation were significantly higher for suicide exposed individuals, and for those with suicide and traumatic death exposure than non-exposed. A fourfold increase in odds of suicide

Table 3
Odds ratios of meeting diagnosis cutoff for depression, anxiety, PTSD, and prolonged grief (PG) syndromal status for suicide exposed veterans.

Odds Ratio (95% CI)				
Variable	Depression diagnosis	Anxiety diagnosis	PTSD diagnosis	PG Syndromal status
Stage 2:				
Number of suicide exposures	1.00 (CI:.95–1.06)	.96 (CI.89–1.03)	.93 (CI.21–1.07)	1.02 (CI.92–1.12)
Recency of exposure	1.01 (CI 1.00–1.03)	1.01 (CI.99–1.03)	1.01 (CI.98–1.03)	.99 (CI.96–1.02)
Stage 3:				
Closeness	1.41 (CI 1.15–1.71)[a]	1.51 (CI 1.21–1.89)[b]	1.67 (CI 1.25–2.23)[b]	2.47 (CI 1.60–3.83)[b]
Stage 4:				
Traumatic death exposure	1.88 (CI 1.01–3.48)	1.86 (CI.98–3.55)	1.86 (CI.89–3.89)	1.66 (CI 1.27–2.16)
ROC area under the curve				
Stage One	.68 (CI.62–.75)[b]	.72 (CI.66–.78)[b]	.71 (CI.63–.79)[b]	.75 (CI.65–.75)[b]
Stage Two	.69 (CI.63–.76)[b]	.72 (CI.66–.78)[b]	.70 (CI.62–.78)[b]	.74 (CI.64–.85)[b]
Stage Three	.70 (CI.64–.77)[b]	.75 (CI.67–.83)[b]	.75 (CI.75–.75)[b]	.84 (CI.76–.92)[b]
Stage Four	.72 (CI.65–.72)[b]	.75 (CI.69–.82)[b]	.76 (CI.68–.83)[b]	.84 (CI.76–.92)[b]
Nagelkerke				
Stage One	.08	.13	.12	.14
Stage Two	.09	.14	.12	.16
Stage Three	.14	.20	.20	.26
Stage Four	.16	.22	.21	.26

NOTE: Controlled covariates inserted in first stage were as follows: Age, Sex, Race, Rural/Urban, Total Years in Armed Forces, Total Length of Combat Deployment in Weeks. Number of suicide exposures, recency of suicide exposure were inserted in Stage 2. Perceptions of closeness inserted in Stage 3. Traumatic death exposure inserted in the fourth stage of each model. Coefficients reported here are from the final (fourth) stage of each model.
[a]$p \leq .01$. [b]$p \leq .001$.

Table 4
Odds ratios of suicide ideation for suicide-traumatic death sequence of events

Odds Ratio (95% CI)	
Variable	Suicide ideation
Suicide-traumatic death Sequence*	3.56 (CI 1.34–9.46)[a]
ROC area under curve	
Stage 1 (Demographics)	.67 (CI .56–.79) [a]
Stage 2 (Suicide-traumatic death sequence)	.75 (CI .63–.86) [a]
Nagelkerke	
Stage 1 (Demographics)	.10
Stage 2 (Suicide-traumatic death sequence)	.15

NOTE: Covariates inserted in first stage were as follows: Age, Sex, Race, Rural/Urban, Total Years in Armed Forces, Total Length of Combat Deployment in Weeks.

* Suicide-Traumatic Death Sequence inserted in second stage of each model. Coefficients reported here are from final (second) stage of each model.

[a] $p \leq .001$

ideation occurred for those who experienced suicide exposure first in the sequence of events. These findings are critical as they appear to indicate that exposure to suicide before exposure to traumatic death, such as training accidents or combat death may put individuals at greater risk for their own suicidal behavior. This finding may provide critical insight for clinicians gathering meaningful data from veterans, as well as civilian populations, about their trauma related experiences as precursors to psychopathology and the potential meaningful impact of the sequence of types of traumatic experiences. Assessing for increased suicide risk may now include factors that are buried in a person's personal history and may depend upon more careful history-taking and understanding of the sequence of suicide exposure to other sudden and traumatic deaths. This highlights a need for further research into the sequential impacts of traumatic events including suicide exposure as a significant trauma.

6. Limitations

The fact that the study was drawing from a single southern US state limits generalizability. Other limitations include the use of a random digit dial survey, a method with increasingly small response rates, even despite best practices such as our inclusion a cell phone sample. The also study represents an older sample of veterans. It will be important to replicate the study with younger veterans or active duty military members to determine how recent increases in the military suicide rates might impact prevalence of exposure and sequalea. Finally, the use of retrospective report is a limitation which needs to be addressed in future longitudinal research.

7. Conclusions

This study contributes uniquely to the literature with meaningful contributions to both suicide epidemiology, as well as clinical impact. Suicide is a notoriously difficult behavior to predict, but the findings of this study may provide critical direction for clinicians who may be perfectly situated to identify apparent or occult risk in veterans who have had exposure to both military-related and suicide-related traumatic death. The salience of primary exposure to suicide, when there has been exposure to both suicide and other traumatic military death, is an especially meaningful contribution. However, it may also require that clinicians become more sensitive to order of traumatic experiences, as well as more comfortable talking with clients (veteran and civilian) about their experiences with suicide. It is imperative for clinicians to probe for a personal history with suicide exposure in order to more adequately assess how exposure to suicide among family as well as their extended social networks may impact current functioning. Clinicians may be reticent to ask questions about suicide, due to their lack of comfort or familiarity with clinical interviewing around suicide. This may require extra training or supervision, but should be encouraged in order to more adequately assess for current potential suicide risk or other detrimental psychopathology, such as elevated depression and anxiety.

The views expressed in this article are those of the authors and do not necessarily represent the official policy or position of Department of Veterans Affairs, Department of Defense or the United States Government. This research was supported, in part, by grants awarded to the Denver VA Medical Center and to Florida State University by the Department of Defense. The Department of Defense had no further role in the study design; in the collection, analysis, and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication. Denver VA Medical Center Grant Number: W81XWH-10-2-0178, Florida State University Grant Number: W81XWH-10-2-0181.

Role of funding source

This research was supported, in part, by grants awarded to the Denver VA Medical Center and to Florida State University by the Department of Defense. The Department of Defense had no further role in the study design; in the collection, analysis, and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication. Denver VA Medical Center Grant Number: W81XWH-10-2-0178, Florida State University Grant Number: W81XWH-10-2-0181.

The funding source had no involvement in study design, collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication.

Conflict of interest

The views expressed in this article are those of the authors and do not necessarily represent the official policy or position of Department of Veterans Affairs, Department of Defense or the United States Government. This research was supported, in part, by grants awarded to the Denver VA Medical Center and to Florida State University by the Department of Defense. The Department of Defense had no further role in the study design; in the collection, analysis, and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication. Denver VA Medical Center Grant Number: W81XWH-10-2-0178, Florida State University Grant Number: W81XWH-10-2-0181. The authors report no other conflicts of interest or disclosures.

Acknowledgments

UK Survey Research Center.

References

Blumberg, S., Luke, J., Ganesh, N., 2012. Wireless substitution: State-level estimates from the National Health Interview Survey, 2010-2011. National Health Statistics Reports, Vol. 61. National Center for Health Statistic, Hyattsville, MD.

Bolton, J.M., Au, W., Leslie, W.D., Martens, P.J., Enns, M.W., Roos, L.L., Sareen, J., 2013. Parents bereaved by offspring suicide: a population-based longitudinal case-control study. [Research Support, Non-U.S. Gov't]. JAMA Psychiatry 70 (2), 158–167. http://dx.doi.org/10.1001/jamapsychiatry.2013.275.

Boscarino, J.A., 2006. External-cause mortality after psychologic trauma: The effects of stress exposure and predisposition. Compr. Psychiatry 47 (6), 503–514.

Breslau, N., Peterson, E.L., Kessler, R.C., Schultz, L.R., 1999. Short screening scale for DSM-IV posttraumatic stress disorder. Am. J. Psychiatry 156 (6), 908–911.

Bryan, C.J., Clemans, T.A., 2013. Repetitive traumatic brain injury, psychological symptoms, and suicide risk in a clinical sample of deployed military personnel. JAMA Psychiatry 70 (7), 686–691. http://dx.doi.org/10.1001/jamapsychiatry.2013.1093.

Bryan, C.J., Clemans, T.A., Hernandez, A.M., Rudd, M.D., 2013. Loss of consciousness, depression, posttraumatic stress disorder, and suicide risk among deployed military personnel with mild traumatic brain injury. J. Head Trauma Rehabil. 28 (1), 13–20. http://dx.doi.org/10.1097/HTR.0b013e31826c73cc.

Bryan, C.J., Hernandez, A.M., Allison, S., Clemans, T.A., 2013. Combat exposure and suicide risk in two samples of military personnel. [Article]. J. Clinical Psychol. 69 (1), 64–77. http://dx.doi.org/10.1002/jclp.21932.

CASRO, 1982. Special report: On the definition of response rates, Council of American Survey Research Organizations. CASRO, Port Jefferson, NY.

Castro, C.A., McGurk, D., 2007. The intensity of combat and behavioral health status. Traumatology 13 (4), 17.

Cerel, J., Maple, M., van de Venne, J., Moore, M., Flaherty, C., Brown, M.M. n press, 2015 Suicide exposure in the community: Prevalence and correlates in one US state. Public Health Reports.

Department of Veterans Affairs,. (2010). Facts about veteran suicide.Department of Veterans Affairs (2010). Veterans by Selected Period of Service and State: 2010, from ⟨http://www.census.gov/compendia/statab/2012/tables/12s0520.pdf⟩.

Hoge, C.W., Castro, C.A., 2012. Preventing suicides in US service members and veterans: concerns after a decade of war. J. Am. Med. Assoc. 308 (7), 671–672.

Kessler, R.C., Heeringa, S.G., Stein, M.B., Colpe, L.J., Fullerton, C.S., Hwang, I., Ursano, R.J., 2014. Thirty-day prevalence of DSM-IV mental disorders among nondeployed soldiers in the US Army: results from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). JAMA Psychiatry 71 (5), 504–513. http://dx.doi.org/10.1001/jamapsychiatry.2014.28.

Kirsch, B., 2014. Preventing suicide in US veterans remains challenging. Lancet 383 (9917), 589–590. http://dx.doi.org/10.1016/s0140-6736(14)60206-3.

Latham, A.E., Prigerson, H.G., 2004. Suicidality and Bereavement: Complicated Grief as Psychiatric Disorder Presenting Greatest Risk for Suicidality. Suicide Life-Threat. Behav. 34 (4), 350–362. http://dx.doi.org/10.1521/suli.34.4.350.53737.

Martin, A., Rief, W., Klaiberg, A., Braehler, E., 2006. Validity of the brief patient health questionnaire mood scale (PHQ-9) in the general population. Gen. Hosp. Psychiatry 28 (1), 71–77.

Miller, M., Azrael, D., Barber, C., Mukamal, K., Lawler, E., 2012. A call to link data to answer pressing questions about suicide risk among veterans. Am. J. Public Health 102 (Suppl 1), S20–S22. http://dx.doi.org/10.2105/AJPH.2011.300572.

Nock, M.K., Stein, M.B., Heeringa, S.G., Ursano, R.J., Colpe, L.J., Fullerton, C.S., Kessler, R.C., 2014. Prevalence and correlates of suicidal behavior among soldiers: results from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). JAMA Psychiatry 71 (5), 514–522. http://dx.doi.org/10.1001/jamapsychiatry.2014.30.

Pitman, A., Osborn, D., King, M., Erlangsen, A., 2014. Effects of suicide bereavement on mental health and suicide risk. Lancet Psychiatry 1 (1), 86–94.

Prigerson, H.G., Horowitz, M.J., Jacobs, S.C., Parkes, C.M., Aslan, M., Goodkin, K., Maciejewski, P.K., 2009. Prolonged grief disorder: psychometric validation of criteria proposed for DSM-V and ICD-11. Plos Med. 6 (8), http://dx.doi.org/10.1371/J..pmed.1000121.

Sareen, J., Cox, B.J., Stein, M.B., Afifi, T.O., Fleet, C., Asmundson, G.J., 2007. Physical and mental comorbidity, disability, and suicidal behavior associated with posttraumatic stress disorder in a large community sample. Psychosom. Med. 69 (3), 242–248.

Schoenbaum, M., Kessler, R.C., Gilman, S.E., Colpe, L.J., Heeringa, S.G., Stein, M.B., Army, S.C., 2014. Predictors of suicide and accident death in the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS): results from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). JAMA Psychiatry 71 (5), 493–503. http://dx.doi.org/10.1001/jamapsychiatry.2013.4417.

Spitzer, R.L., Kroenke, K., Williams, J.B., 1999. Validation and utility of a self-report version of PRIME-MD: the PHQ primary care study. Primary Care Evaluation of Mental Disorders. Patient Health Questionnaire. JAMA 282 (18), 1737–1744 [pii].

SPSS, I., 2011. IBM SPSS Statistics for Windows, Version 20.0. IBM Corp, New York.

US Department of Agriculture, Economic Research Service. (2012). Rural-Urban Continuum Codes, from ⟨http://www.ers.usda.gov/data-products/rural-urban-continuum-codes.aspx#.U9e6O7HLLIs⟩.

Military Behavioral Health

ISSN: 2163-5781 (Print) 2163-5803 (Online) Journal homepage: http://www.tandfonline.com/loi/umbh20

Suicide-Focused Group Therapy for Veterans

Lora L. Johnson, Stephen S. O'Connor, Barbara Kaminer, David A. Jobes & Peter M. Gutierrez

To cite this article: Lora L. Johnson, Stephen S. O'Connor, Barbara Kaminer, David A. Jobes & Peter M. Gutierrez (2014) Suicide-Focused Group Therapy for Veterans, Military Behavioral Health, 2:4, 327-336, DOI: 10.1080/21635781.2014.963762

To link to this article: http://dx.doi.org/10.1080/21635781.2014.963762

Accepted online: 16 Sep 2014.Published online: 06 Nov 2014.

MILITARY BEHAVIORAL HEALTH, 2: 327–336, 2014

ISSN: 2163-5781 print / 2163-5803 online
DOI: 10.1080/21635781.2014.963762

Routledge
Taylor & Francis Group

Suicide-Focused Group Therapy for Veterans

Lora L. Johnson
Robley Rex Veterans Affairs Medical Center–Louisville, Louisville, Kentucky

Stephen S. O'Connor
Western Kentucky University, Bowling Green, Kentucky

Barbara Kaminer
Robley Rex Veterans Affairs Medical Center–Louisville, Louisville, Kentucky

David A. Jobes
The Catholic University of America, Washington, District of Columbia

Peter M. Gutierrez
VISN 19 MIRECC/University of Colorado School of Medicine, Denver, Colorado

The U.S. military and veteran populations are presently at increased risk for suicide when compared to demographically matched cohorts in the general population. Previous research suggests that the constructs of perceived burdensomeness and thwarted belongingness may contribute to the desire for death in these populations. Method: In this article we describe a post-hospitalization group therapy designed specifically for suicidal veterans that utilizes a collaborative approach to foster relationships and interpersonal contributions between group members and focuses on the specific factors underlying each individual's suicidal ideation. Results: Preliminary results from the existing post-hospitalization group therapy suggest that the intervention is acceptable to clients and providers and feasible to deliver in a real-world clinical setting. Conclusion: This clinical care-transition model provides a potentially cost-effective and meaningful suicide-specific intervention for the critical post-discharge risk period.

Keywords: Suicide, attempt, veterans, self-injurious behavior, group

Suicide is a serious global public health concern. Worldwide, suicide accounts for approximately 1 million deaths annually (World Health Organization, 2013). According to the Centers for Disease Control and Prevention, and the National Center for Health Statistics from 2006 to 2007, of the top 15 causes of death in the United States, the top three—heart disease, cancer, and stroke—demonstrated a continued long-term decreasing trend (Xu, Kenneth, Kochanek, Sherry, & Murphy, 2010). In contrast, significant *increases* were seen in only two causes of death: suicide and chronic liver disease. To this end, suicide is now the tenth leading cause of death in the United States and accounts for one death every 15 minutes (McIntosh & Drapeau, 2012).

The U.S. military and veteran populations are presently at increased risk for suicide when compared to demographically matched cohorts in the general population (McCarthy et al., 2009; Sher & Yehuda, 2011) with data suggesting that the overall suicide rate of military personnel and veterans appears to be rising and outpacing the general population (Kang & Bullman, 2008; Lineberry & O'Connor,

The views expressed in this article are those of the authors and do not necessarily represent the official policy or position of Department of Veterans Affairs, Department of Defense or the United States Government.

Address correspondence to Stephen S. O'Connor, Western Kentucky University, Psychological Sciences, Gary Ransdell Hall 3046, 1906 College Heights Ave, Bowling Green, KY 42101. E-mail: stephen.oconnor@wku.edu

Color versions of one or more of the figures in the article can be found online at www.tandfonline.com/umbh.

2012). Males 50 years of age and older represent the majority of those veterans who die by suicide (Kemp & Bossarte, 2012); however, other recent findings from the Department of Veterans Affairs (VA) for the population of veterans who utilize Veterans Health Administration (VHA) services show apparent increases in overall suicide rates for women veterans and in veteran men under age 25. Suicide rates are lower and appear to be decreasing in younger veterans who utilize VHA services when compared to younger veterans who choose to not use VHA services (Schoenhard, 2011). Taken together, this information suggests the possibility that veterans are at higher risk for suicide when compared to the general population but that those veterans who utilize services may be benefiting.

PREVENTION APPROACHES

Several large epidemiological studies have led to the identification of specific clinical and demographic characteristics associated with elevated risk of suicide, including previous suicide attempts, psychiatric diagnoses, recent psychiatric hospitalization, impulsivity and aggression, male gender, nonmarried relationship status, and Caucasian race (Kessler, Borges, & Walters, 1999; Nordstrom, Samuelsson, & Asberg, 1995). Results from a retrospective study of suicide in current and former U.S. military personnel by Leard-Mann and colleagues (2013) suggests that risk factors for suicide in the general population, including mental disorders, may also apply to suicide in military populations. Research efforts are currently under way to more thoroughly understand the unique contributions that protective factors, vulnerability factors, and stressful life events have on suicide risk in U.S. military and veteran populations (Nock et al., 2013).

Bearing in mind the research literature on suicide risk and protective factors, the Department of Defense and VA have utilized the full range of public health–informed prevention approaches to address individuals at increased risk for suicide. For example, the U.S. Air Force Suicide Prevention Program has shown success as a universal prevention program in developing comprehensive guidelines for creating an environment that reinforces suicide prevention attitudes and behaviors (Knox, Litts, Talcott, Feig, & Caine, 2003). Secondary prevention efforts, including mental health screening during medical visits and in-processing following deployment, have become an aspect of usual care practices. A series of studies measuring tertiary prevention strategies for individuals identified as having suicidal thoughts and behaviors, typically involving medication and/or therapy interventions, are currently under way.

One unique hybrid model for suicide prevention created by the VA involves local suicide prevention programs at VA medical centers. These programs function as the epicenter of planning and activity for suicide prevention initiatives for local VAs and their surrounding communities. Each VA facility has at least one suicide prevention coordinator who is a licensed mental health service provider. Typically, larger facilities have more suicide prevention staff members. Suicide prevention coordinators are responsible for overseeing the overall suicide prevention efforts at the medical center and affiliated community based outpatient clinics (CBOCs). Activities may include hosting colloquia on suicide risk assessment and treatment approaches, implementing employee-wide gatekeeper training, developing tracking procedures for at-risk veterans, and evaluation of new engagement and intervention programs. This approach provides suicide prevention coordinators the flexibility to adopt a broad array of prevention strategies to match the specific needs and context of the veteran populations their VA medical centers serve (Kemp, 2006). In addition, it allows suicide prevention coordinators, who provide leadership of local suicide prevention programs, to utilize their professional strengths when developing new programs. This article describes one such initiative to develop a theory-driven group therapy intervention designed to help decrease suicide risk in veterans. We thus describe our guiding theoretical approach to the challenges of veteran suicide that helped shape this novel intervention.

INTERPERSONAL PSYCHOLOGICAL THEORY OF SUICIDE IN VETERANS

While epidemiologic findings are helpful in identifying subgroups at increased risk for suicide, development of effective intervention programs requires additional understanding of the mechanisms underlying the progression toward increasingly serious forms of self-directed violence, in other words, passive suicidal thoughts, active preparation, and suicide attempts. One of the most empirically supported theories examining self-directed violence is the interpersonal psychological theory of suicide (IPTS; Van Orden et al., 2010). The IPTS posits that suicides are determined by the urge to die and the ability to perform a lethal act. The urge to die is comprised of two factors: thwarted belongingness and perceived burdensomeness. Thus, individuals are drawn toward suicide if they feel fewer interpersonal connections and reasons for living, as well as a sense that their personal needs outweigh the contributions they make toward family, friends, and society at large. Simultaneously, the capability to suicide is acquired through a variety of painful and provocative physical and/or psychological experiences (e.g., multiple surgeries to repair orthopedic injuries, frequent exposure to gravely injured others) leading to reduction in fear-related cognitions about death and dying.

The IPTS has been studied in military and veteran populations, with results from several studies demonstrating that higher levels of perceived burdensomeness, thwarted

belongingness, and acquired capability are associated with increased risk for self-directed violence. For example, Nademin and colleagues (2008) found that Air Force personnel who died by suicide could reliably be discriminated from living Air Force personnel using a composite score based on the three IPTS components. Bryan and colleagues (Bryan, Clemans, & Hernandez, 2012; Bryan, Morrow, Anestis, & Joiner, 2010) later demonstrated in two separate studies of military personnel that the main effects and interactions between acquired capability and perceived burdensomeness were associated with previous suicide attempts, while thwarted belongingness was not. More recently, Monteith, Menefee, Pettit, Leopoulos, and Vincent (2013) conducted the first quantitative analysis examining the association between the IPTS and suicide risk in 186 veterans receiving inpatient psychiatric services. Their findings indicate that while perceived burdensomeness showed a consistent significant association with current suicidal ideation, thwarted belongingness was significantly associated with suicidal ideation only for individuals who also reported elevated levels of perceived burdensomeness. Additional analyses demonstrated that higher scores on all three IPTS components were significantly greater in individuals with two or more previous suicide attempts compared to individuals with no previous suicide attempts.

Therefore, it may be effective for suicide prevention efforts to focus on at-risk subgroups within the military and veteran populations by creating opportunities for individuals to make meaningful contributions and strengthen interpersonal bonds while receiving mental health services. Introducing such services in close proximity to a suicidal crisis, such as a recent suicide attempt or inpatient psychiatric hospitalization for suicidal urges, may increase the likelihood that referred patients will engage with outpatient mental health services (Boudreaux, Bock, & O'Hea, 2012).

It should also be noted that a major focus of the National Action Alliance Clinical Care and Intervention Task Force (National Action Alliance for Suicide Prevention: Clinical Care and Intervention Task Force, 2011), is a "systems approach" to clinical care wherein a postpsychiatric inpatient discharge to a suicide-specific group intervention may prove to be a critical kind of intervention that makes transition from inpatient care to outpatient care a much more effective disposition that should prove to be cost effective and meaningfully decrease risk in the high-risk postdischarge period (Appleby et al., 1999; Qin & Nordentoft, 2005).

GROUP THERAPY FOR SUICIDAL VETERANS

In 2008, the Suicide Prevention Program (SPP) at The Robley Rex Veterans Affairs Medical Center (VAMC) in Louisville, Kentucky, began examining potential tertiary prevention strategies for suicide attempt survivors who were currently receiving mental health services at their facility. Of particular interest was the feasibility of developing a group therapy where veterans could be enrolled immediately following inpatient psychiatric hospitalization. The SPP members conceptualized that a group therapy modality would provide veterans with an opportunity to develop therapeutic and personal relationships while contributing to one another's efforts at rehabilitation. In effect, this intervention would target the two aspects of the IPTS specifically associated with the desire for death. In addition, a group context offered the potential of creating collaborative relationships between group members working together to reduce their individual suicide risk. The establishment of a cohesive and collaborative group focused on the specific factors underlying each member's suicide risk would reflect the therapeutic philosophy intrinsic to the collaborative assessment and management of suicidality (CAMS; Jobes, 2006; see Figure 1). It was hypothesized that the use of peers in a group would offer the ultimate

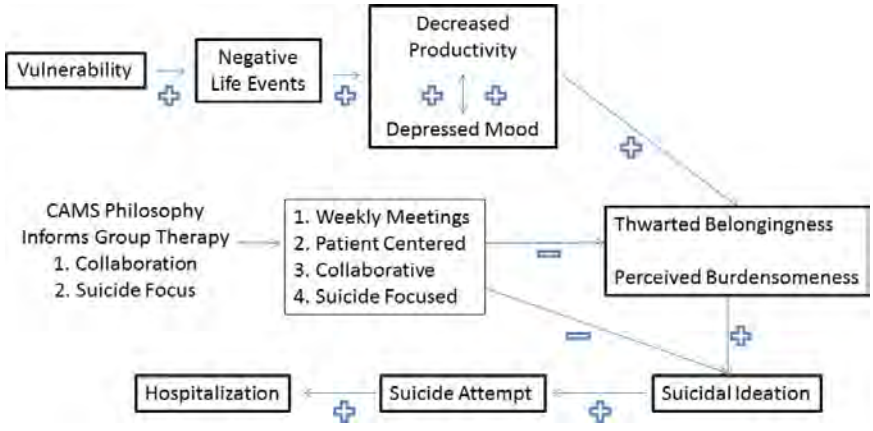


FIGURE 1 Conceptual model informing suicide-focused group therapy for veterans: Etiology of suicidal ideation, attempts, and hospitalizations. Emphasis on how CAMS (collaborative assessment and management of suicidality) philosophy informs group therapy to decrease thwarted belongingness and perceived burdensomeness while also targeting suicidal ideation specifically.

collaborative opportunity in which individual participants could feel like partners in treatment.

A review of the scientific literature provided sparse information on similar groups previously developed for other populations of suicide attempt survivors. The closest example of a group therapy designed for suicidal individuals is dialectical behavior therapy (DBT), a comprehensive psychosocial intervention designed for individuals diagnosed with borderline personality disorder that includes a weekly skills training group session, along with weekly individual psychotherapy, access to 24-hour phone coaching seven days per week, and weekly consultation group for therapists (Linehan, 1993; Linehan et al., 2006). DBT procedures dictate that suicidal thoughts, urges, and behaviors are not to be discussed in the group therapy session due to risk of contagion. Rather, they are to be addressed during weekly individual therapy sessions where they can be understood in depth and targeted with proactive problem-solving strategies.

The SPP at Robley Rex VAMC sought to design an intervention to meet the needs expressed by the suicide attempt survivors while also maintaining the focus on coping with suicidal ideation. The goal was to do so in a way that would increase the individual safety of the group members, by fostering a sense of shared mission, namely recovering from a suicidal crisis. To this end, each potential group member, from the inception of the group to the present, is discussed individually by the SPP (with input from treatment providers) prior to group referral and entry. The only automatic exclusion criterion is cognitive impairment that prohibits the individual from being able to comprehend or function in the group setting. Typically, individuals with a variety of other factors that are associated with interpersonal problems are included in the group, as these are frequently issues directly related to suicidal ideation. However, they are included only if these factors do not threaten the integrity of the group or the welfare of another group member.

For example, having psychotic symptoms might traditionally exclude someone from a group therapy setting. However, for this group, if the individual has periods of stability in which he or she can attend and benefit from the group process and connecting with others, and the psychosis does not include such features as paranoia that will put other group members at risk, he or she will likely be included. Similarly, being a sex offender will not automatically exclude someone from the group. However, if the nature of the offense and the individual's current presentation and attitudes about the offense would likely trigger other group members, the individual will not be referred to group. The same process is utilized in considering individuals with personality disorders and other unique variables that could hinder the group process. In short, the SPPs allow as many suicidal individuals as possible to benefit from the group but not at the expense of other group members or the life of the group itself.

The highly collaborative nature of this group is evident when considering inclusion/exclusion in cases in which it is not immediately clear if the individual should be included in the group. In these cases, the group leaders and potential member openly discuss concerns about enrollment, which often results in a mutually agreed upon plan for a trial period in the group. In this way, both the group leaders and the individual can explore the potential benefit to attending group, while also allowing for that individual to discontinue or to be discontinued in group if either party believes the fit is not optimal. In February 2009, members began attending the new group therapy for suicide attempt survivors.

During the early stage of treatment development, group members helped develop the group through participation in traditional group interactions such as providing feedback for one another and giving input in problem-solving situations. In this group, though, the group members also helped inform the design of the sessions. Initial sessions combined psychoeducational and process portions, in which a specific suicide-related topic, such as coping skills or recognition of triggers, would be discussed. The group, would then, with facilitation by the therapists, be allowed to process whatever thoughts, feelings, and questions were elicited by the topic. After a few sessions, however, group members indicated that they strongly preferred the interpersonal process portion of the group. In response, the group structure shifted to a completely process-oriented group in which group members were encouraged to bring whatever suicide-related topics they desired to discuss and process with the other group members. Although we did briefly experiment with inviting clinicians outside of the group to speak about certain risk factors associated with suicide that several group member had in common, the leaders and group members decided together to discontinue this approach due to the preference for a process-oriented group. In addition, it was difficult to match speaker dates with the varying attendance schedules of the group members. From that time to the present, the group topics have been self-directed, providing that content remains under the topic umbrella of suicidal ideation (e.g., direct issues with suicidal ideation or with other problems that relate to the individual's suicidal ideation). This is another example of the highly collaborative nature of the group, a component deemed important to successful recovery (Jobes, 2006).

Yet another demonstration of collaboration between the group leaders and members was the development of the group rules. The group leaders came to the first group with a verbalized expectation for all members to respect the confidentiality of others and the topics discussed in the group. After multiple sessions, the group members helped develop rules as situations arose. For example, when a group member took phone calls a few times in the group, the group discussed the issue and collaboratively (including the

individual who took the calls) decided that it was fine to take a call if it was emergent. However, the group requested that (1) phones be placed on vibrate mode so the ringing did not disturb the group and (2) if a phone call had to be taken, the group member should leave the room to take the call. Similarly, when group members made comments to one another quietly while another group member spoke, the group leaders suggested that no side conversations be allowed during sessions. Group members discussed the topic, agreed, and adopted this idea under the general rule of "be respectful" to other group members when they talk. This rule has also grown to include not interrupting others when they talk.

Over time, some additional structure was added to the group sessions, although the process of the topics brought to the group by the participants remained the central feature of the group. As the number of participants increased, chips were added to the check-in process. The chips used are poker chips (in two colors) but could be any handheld token. As individuals "check in" with the group, they are asked if they need additional time in the group to discuss anything. If they say they would like some time to process something, they are given blue chips to hold until their turns. If they decline a blue chip but a group leader or other participant wants to ask that person for more information about something stated during the check-in, is concerned about something with that person, wants follow-up information from a topic discussed in an earlier group, or the like, he or she can give the group member a white chip. After all group members check in, discussion begins with the first person holding a blue chip. After all individuals with blue chips have had a chance to share in group, the white chips are addressed.

Group leaders have found the chip process to be instrumental in terms of organization and in terms of promoting the collaborative nature of the group. Organizationally, the chips offer a tangible marker for the group leaders and group members that help the group keep to task and manage time effectively to get to all individuals holding a chip. Further, the chips allow for a prioritized order to addressing group members' issues. Over time, the group members became more comfortable not only giving white chips to one another but also in expressing the reasoning for giving the chip and continuing to contribute to the resultant conversation that helps the other group member work through the issue. This is an example of how this approach has fostered the group members' roles as collaborators in one another's recovery process.

When group members enter the group, they are asked to attend four sessions prior to deciding if they would like to continue in the group treatment. This time-limited agreement is reflective of the approach taken in CAMS. After four sessions, they are allowed to self-discharge when they feel they no longer need the support/therapeutic gains they have received from the group. This approach has fostered the collaborative nature of the group in that it has allowed each group member to feel a sense of control in his or her ongoing participation in the group. Many group members have verbalized that, even when experiencing no suicidal thoughts for multiple weeks, they believe the group plays a part in the absence of those thoughts, supporting the decision to allow for self-discharge as opposed to discharge based on some clinical criteria such as reduced acute suicidal thoughts. At the end of each group session, group leaders ask which group members are planning to return. A successful discharge is one in which exiting group members indicate after a group session or via a follow-up contact that they feel they have benefited from the group but no longer feel the need to attend. When a group member chooses to self-discharge, group leaders consider his or her current risk status and the overall therapeutic progress the member has shown over the course of treatment. If group leaders have concerns that a group member is choosing to discontinue for reasons other than successful therapeutic gain (e.g., current acute suicide risk, dissatisfaction with the group), the leaders will discuss the concerns with the group member. They will attend to any acute needs and then work with the individual on either making adjustments to continue to try to work in the group setting or making an individualized referral plan. Any group member who has left the group under any circumstances (other than being asked to leave) is eligible to return if he or she wants to work more on issues related to suicidality. This approach has also fostered the collaborative nature of the group in that group members who might be having emotional difficulty sometime after group discharge can reconnect with the therapists and other group members to work together to examine their current emotional status and talk about options for follow-up. Multiple group members in the past have returned to group in this way; commonly saying they came back for a "tune-up."

There are two group leaders assigned to each group, and they serve as facilitators of the interpersonal process that occurs between the group members around the topics of discussion. For example, the group leaders attempt to aid the group members in using one another's reactions, feedback, support, and recommendations as mechanisms for change in each individual's growth process. In this light, the group's process is rooted within an interpersonal orientation. However, due to concerns about the safety of addressing suicidal ideation in the group setting, and because the group leaders are licensed independent practitioners with specialized training in therapeutic intervention for suicide, these groups also incorporate feedback and directed therapeutic intervention at times from the group leaders. These interventions from the group leaders can be based in any theoretical orientation, and work toward the general overarching goal of reducing suicidal ideation.

MANAGING RISK

Group leaders have facilitated the group and helped keep the group on suicide-related topics by asking each group member to "check in" concerning recent and current suicidal ideation at the beginning of the session. This "check in" is informal, asking a nonscripted question that is not verbatim but close to, "How have you been doing in the past week with suicidal thoughts, plans, intent, etc.?" After reporting on current status, the group member is asked by the group leader if he or she would like more time to talk about anything with the group after the check-in. When check-ins are complete, the members who requested time take turns describing their issues to the group, at which time the previously described interpersonal process and other interventions begin.

If at any time during the group a member indicates possible acute risk for suicide (either verbally or through notable behaviors), group leaders will ask directly about suicidal ideation in the group setting. Other than direct statements concerning plans/intent for suicidal behaviors, an example of behaviors in group suggestive of potential suicide risk would be a veteran who has historically experienced suicidal urges in conjunction with feelings of loss around the death of loved ones and comes to group disheveled, reeking of alcohol and urine, and talking about his depression over the recent loss of his brother.

Of note, on multiple occasions, prior to group leaders asking directly about suicide risk, group members have directly asked questions about whether an individual is considering suicide and whether that person feels he or she can stay free from self-directed violence until the next group session. In these situations, the group members initiate the suicide risk assessment and participate, as facilitated by the group leaders, in helping the group member work through his or her feelings and intentions, as well as work on safety planning. In addition, the group members have not only helped work on the development of safety plans but also become parts of one another's safety plans. Steps 3 and 4 of the VA-endorsed safety plan involves identifying other individuals who help distract from negative thoughts and feelings and identifying other individuals who can be talked to about the problem when one is feeling down. Many group members have developed relationships in which they share phone numbers and become these trusted individuals for one another.

If further detailed acute suicide risk assessment is indicated, the individual either will be immediately removed from group and further assessed by one group leader or will be kept after group for further assessment, and can be taken directly to the emergency department within the same facility if necessary. On the rare occasion that a group member has to be removed from a group for further assessment, the group leader who remains in the group processes the situation with the remaining group members in terms of the reason for removal, what is being done to assist the removed member with the current situation, the remaining group members' feelings about what happened, and what the reintegration plan will be to get the member back to group. The leader who takes the individual out of the group deals with the acute situation and lays the groundwork for reintegration to the group by talking about the group leaders' and group members' concerns for the individual and the plan for returning to group after the acute situation is over. Upon return to group, the group leaders openly discuss the previously removed individual's thoughts and feelings about the past situation and invite the group to help process the entire past and present situation with the individual. On the very few occasions that this has occurred, group members have been very welcoming and supportive of returning group members, and returning group members have accepted that support and showed it to others at later times.

This same process is followed if a group member comes to group displaying behavior that is not suicidal but potentially threatening to the well-being of other group members. For example, the group has discussed substance use and group attendance in depth and worked to address the conflicting interests of helping an individual who is struggling with substances while also protecting others in the group who might be triggered by substance use. The group members and group leaders have agreed on the importance of allowing group members to come to group if they have been using substances. Because substance use accompanies suicidal ideation for many individuals, the group members and leaders agreed on the importance of group members being able to come to the group if they have been using and are in need of help. However, simultaneously, recovery from substance use is often an issue for multiple attendees. Due to this fact, group members verbalized their desire to protect themselves from being triggered to use substances while still being able to help other group members in these times. To that end, group members and leaders spoke at length, considered all input, and agreed that individuals can present to the group after using substances. However, when intoxication becomes evident to the group through behavioral indicators, group members and/or group leaders will question the observed behaviors. Because there are many potential etiologies for behaviors that may be interpreted as intoxication, group leaders encourage group members to ask questions about any concerning behaviors they observe in other members. The importance of inquiries based in support and concern is stressed, as opposed to accusatory inquiries. Leaders stress to group members that they share the responsibility for making these inquiries, as the group members might notice something or perceive it in a different way than do the group leaders. However, it is also stressed that the follow-up to those observations and inquiries (assessment and intervention including possible removal from group) are the responsibility of the group leaders.

Session times are flexible, lasting between 60 and 90 minutes based on the needs of the group during each session. Group leaders actively and openly redirect the group if the topic shifts off of suicide-related process work. This is notably dissimilar from a DBT group, where the focus is specifically on skills training in a group format. The decision to encourage discussion of suicidal thoughts, urges, and behaviors is guided by the fact that the group is specifically focused on supporting veterans in their recovery from suicidal ideation. We have found that our suicidal veterans receive helpful feedback from their peers that is qualitatively different from what a therapist could communicate. Furthermore, many of our veterans have carried an identity as a suicidal individual for many years and benefit from the opportunity to discuss their complex relationship with suicidal ideation. Each session closes with informally assessing each group member for current levels of acute suicidal ideation. Again, this process is not scripted but adheres roughly to the content of this question: "How are you feeling now in terms of suicidal thinking, plans, or intent?" Any necessary follow-up for acute risk is then offered.

PATIENT FEEDBACK, PRELIMINARY OUTCOMES, AND LESSONS LEARNED

This group structure has not been examined through formal research but has consistently demonstrated promising outcomes for veteran participants. For example, veterans anecdotally report:

> All the words in the world can't explain it. You can't understand unless you feel it, having a group of people who are like me and have gone through what I have gone through.

> I come here because I know you all save my life at least every other week.
> We're not here to advise each other but to relate to each other.
> We humans need each other at the lowest point of our lives.
> We need someone to relate to and vent to without being judged.
> This is a place where you can reconnect with other human beings and start building a foundation.
> You don't have to be understood but just listened to, and that's a big relief right there.

Having conducted these groups for some time, some general clinical outcomes are known. As of September 2013, 16 (10%) of the 156 veterans that have attended the group attempted suicide after at least one group attendance. Of these, nine (56%) had come to group only one time and showed indications of resisting or not "hooking in" to the group. Examples include verbal reports of dissatisfaction with the physical group space, wearing sunglasses and declining to participate, attending group only while on a residential service and then never coming back, and barriers to care such as transportation, child care, and work issues. Two of these veterans died by suicide, neither of which demonstrated self-directed violence while attending group, and their deaths occurred eight months and one year after separating from the group, respectively. These results are encouraging, considering extant studies of suicidal behaviors with high-risk samples (Chandrasekaran & Gnanaselane, 2008; Hall, O'Brien, Stark, Pelosi, & Smith, 1998; Johnsson Fridell, Ojehagen, & Traskman-Bendz, 1996). Of note, Rudd and colleagues (Rudd, Joiner, Trotter, Williams, & Cordero, 2008) found that 47% of individuals in treatment following a suicide attempt made at least one subsequent attempt within one year.

We have learned many lessons through the process of developing the group therapy. As stated, the group members found neither a routine psychoeducational component to group nor bringing in targeted speakers based on common group member issues to be acceptable. The group leaders also experimented with meeting around tables rather than sitting side by side in a circle but found that the change resulted in a reduction in eye contact among members as well as a more casual and less focused atmosphere.

The group leaders also experimented with including individuals who were currently in residence on the inpatient unit, which seemingly offered several advantages. If a person had been in group prior to his or her inpatient stay, we were able to keep that individual connected to the group while on the inpatient unit and supplement treatment while working with the inpatient treatment team. This also continued to foster the relationships between that person, the group leaders, and the group members, increasing the likelihood that he or she would return to group as part of the hospital's discharge/transition plan. Similarly, if a new candidate for group was in the inpatient unit, he or she could be brought to group prior to hospital discharge. In this way, he or she could experience what the group was like and start building a relationship with the group leaders and other group members, also increasing the likelihood that he or she would attend the group after hospital discharge. However, despite the advantages to this method, when we had to move our group location farther away from the inpatient unit based on hospital space needs, we could not find a feasible way to continue to include these individuals in our outpatient group. Doing so would require a special order from the individual's physician and a one-to-one monitor while going to another part of the hospital to attend group.

Another area in which we are continuing to learn involves identifying clinical characteristics that often result in disruption to the group process and may inform individuals for whom group is contraindicated. As

previously discussed, we are purposefully very inclusive in group membership, which has generally proved to be a good approach. We recognize that there may have been some individuals for whom the group approach was not particularly helpful, but for whom it was also not harmful, who eventually just stopped attending. However, when specifically addressing what has not worked in this group, we have had three cases in which and individual attending group seemed to be detrimental to either the individual or the group process. The common theme we identify in these three cases (regardless of diagnosis or symptom presentation) is that the individual sees himself or herself as inherently or qualitatively different from the other group members.

In the case in which group participation seemed to be potentially detrimental to the group member, the individual repeatedly verbalized that the group members were nothing like him and could not possibly understand him because they were simple and their histories of suicide attempts were not of the same quality as the group member's history. For two other group members, they identified with the other group members in terms of having a history of suicidality and being "all the same" in that regard. However, these two individuals considered themselves to be at a different level of recovery, which led them to come to group to "help" and teach others what to do to get better. The rolling inclusion of new group members naturally leads those further along their recovery process to share their lessons learned with others; however, these two individuals came to group thinking that they needed no help themselves and that their roles in group were to actively teach others, while the other group members came to both help themselves and others by collaboratively working together to advance everyone's recoveries.

In each of the three cases mentioned, the group leaders had to speak individually with the group member to discuss the apparent lack of fit of the group with the individual's own treatment plan and recovery goals. Together, the group member and group leaders then adapted the group member's treatment plan to ensure that the group member was getting the interventions and services he or she needed to continue to work on a recovery and treatment plan without the group as one of the interventions.

One final area we identify as an area for continued consideration is an open-ended length of treatment with no limits on number of sessions attended. For the reasons discussed earlier, there appear to be several advantages to allowing group members to direct when they attend group and how long they stay as participants. However, we do not want to support a suicidal identity in our group members. We have not currently reached an answer to reconcile our conflicting thoughts in this area. We are considering how transition plans may assist group members in discharging from the group, or potentially assigning mentor positions in the group to longer-term group members who have made significant progress in their recoveries. Currently, some group members naturally and informally fill that role; however, often these are the same individuals who seem to have difficulty separating from the identity of being a suicidal individual forever despite clinical improvements.

CURRENT RESEARCH EFFORTS

Although this group therapy treatment has been both feasible and acceptable to patients and therapists, there is no evidence base for it. In 2012, our research group received a grant from the Military Suicide Research Consortium (http://www.msrc.fsu.edu) to begin studying aspects of the treatment. The primary study aim is to measure the impact of adding a more rigorous and collaborative assessment of suicidal ideation prior to enrollment and throughout the group therapy. The Suicide Status Form (SSF) was chosen as the method for suicide risk assessment given that (1) the group was originally modeled on Jobes's emphasis on building collaboration between group members and facilitators, and (2) the SSF provides an assessment form for initial exploration of specific factors underlying an individual's suicidal ideation, as well as tracking forms that could be easily integrated into the group therapy format. Various studies over the past 20 years have established the assessment value of the SSF (e.g., Conrad et al., 2009; Jobes, Jacoby, Cimbolic, & Hustead, 1997). While the current study is not a treatment-outcome-focused study, it is important to note that use of CAMS and the SSF has extensive empirical support as an effective means of rapidly reducing suicidal ideation and overall symptom distress, while increasing hope and reasons for living (Comtois et al., 2011; Jobes, Kahn-Greene, Greene, & Goeke-Morey, 2009; Jobes, Wong, Conrad, Drozd, & Neal-Walden, 2005).

Approximately 200 patients will be recruited from the inpatient psychiatry unit at the Robley Rex VAMC for the current study. To boost generalizability, suicidal patients with and without a history of suicide attempt are eligible to participate. Patients are randomized to one of two groups ("usual care" or "usual care + stepped-up assessment"). Primary aims for the project are to examine whether the two groups will differ in rates of treatment retention (i.e., attending at least four consecutive sessions) and patient satisfaction. Secondary aims look at group differences on clinical outcomes, including suicidal ideation and quality of life functioning. An additional study aim involves qualitative methods to categorize the elements of the group therapy treatment. All sessions are videotaped and a team of trained research staff are coding the videotapes using an exhaustive categorization scheme developed for the current study. The research team will then use this information to develop a formalized training manual for later efficacy trials examining the group therapy treatment and progress.

CONCLUSION

Given our positive clinical experience of using a group therapy treatment with suicidal veterans, we are struck by the potential merits of enhancing the group experience by adding an evidence-based structured assessment approach like the SSF. With the need for new and innovative clinical approaches to suicide risk—particularly in relation to clinical care transitions—there is an undeniable appeal to working with larger numbers of suicidal patients during the high-risk post inpatient discharge period within a group modality if ultimately proven effective.

FUNDING

This research was supported, in part, by grants awarded to the Robley Rex VA medical center, Denver VA Medical Center and to Florida State University by the Department of Defense. The Department of Defense had no further role in the study design; in the collection, analysis, and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication. Robley Rex VA Medical Center Grant Number: W81XWH-10-2-0178, Denver VA Medical Center Grant Number: W81XWH-10-2-0178, Florida State University Grant Number: W81XWH-10-2-0178.

REFERENCES

Appleby, L., Shaw, J., Amos, T., McDonnell, R., Harris, C., McCann, K., … Parsons, R. (1999). Suicide within 12 months of contact with mental health services: National clinical survey. *British Medical Journal*, *318* (7193), 1235–1239. doi:10.1136/bmj.318.7193.1235

Boudreaux, E. D., Bock, B., & O'Hea, E. (2012). When an event sparks behavior change: An introduction to the sentinel event method of dynamic model building and its application to emergency medicine. *Academic Emergency Medicine*, *19*(3), 329–335. doi:10.1111/j.1553-2712.2012.01291.x

Bryan, C. J., Clemans, T. A., & Hernandez, A. M. (2012). Perceived burdensomeness, fearlessness of death, and suicidality among deployed military personnel. *Personality and Individual Differences*, *52*(3), 374–379. doi:10.1016/j.paid.2011.10.045

Bryan, C. J., Morrow, C. E., Anestis, M. D., & Joiner, T. E. (2010). A preliminary test of the interpersonal-psychological theory of suicidal behavior in a military sample. *Personality and Individual Differences*, *48*(3), 347–350. doi:10.1016/j.paid.2009.10.023

Chandrasekaran, R., & Gnanaselane, J. (2008). Predictors of repeat suicidal attempts after first-ever attempt: A two-year follow-up study. *Hong Kong Journal of Psychiatry*, *18*, 131–135.

Comtois, K. A., Jobes, D. A., S, S. O. C., Atkins, D. C., Janis, K., C, E. C., … Yuodelis-Flores, C. (2011). Collaborative assessment and management of suicidality (CAMS): Feasibility trial for next-day appointment services. *Depression and Anxiety*, *28*(11), 963–972. doi:10.1002/da.20895

Conrad, A. K., Jacoby, A. M., Jobes, D. A., Lineberry, T. W., Shea, C. E., Arnold Ewing, T. D., … Kung, S. (2009). A psychometric investigation of the Suicide Status Form II with a psychiatric inpatient sample. *Suicide and Life-Threatening Behaviors*, *39*(3), 307–320. doi:10.1521/suli.2009.39.3.307

Hall, D. J., O'Brien, F., Stark, C., Pelosi, A., & Smith, H. (1998). Thirteen-year follow-up of deliberate self-harm, using linked data. *British Journal of Psychiatry*, *172*, 239–242. doi: 10.1192/bjp.172.3.239

Jobes, D. A. (2006). *Managing suicidal risk: A collaborative approach*. New York, NY: Guilford Press.

Jobes, D. A., Jacoby, A. M., Cimbolic, P., & Hustead, L. A. T. (1997). Assessment and treatment of suicidal clients in a university counseling center. *Journal of Counseling Psychology*, *44*(4), 368–377. doi:10.1037/0022-0167.44.4.368

Jobes, D. A., Kahn-Greene, E., Greene, J. A., & Goeke-Morey, M. (2009). Clinical improvements of suicidal outpatients: Examining suicide status form responses as predictors and moderators. *Archives of Suicide Research*, *13*(2), 147–159. doi:10.1080/13811110902835080

Jobes, D. A., Wong, S. A., Conrad, A. K., Drozd, J. F., & Neal-Walden, T. (2005). The collaborative assessment and management of suicidality versus treatment as usual: A retrospective study with suicidal outpatients. *Suicide and Life-Threatening Behavior*, *35*(5), 483–497. doi:10.1521/suli.2005.35.5.483

Johnsson Fridell, E., Ojehagen, A., & Traskman-Bendz, L. (1996). A 5-year follow-up study of suicide attempts. *Acta Psychiatrica Scandinavica*, *93*(3), 151–157. doi:10.1111/j.1600-0447.1996.tb10622.x

Kang, H. K., & Bullman, T. A. (2008). Risk of suicide among US veterans after returning from the Iraq or Afghanistan war zones. *JAMA*, *300*(6), 652–653. doi:10.1001/jama.300.6.652

Kemp, J. (2006). *Suicide prevention coordinators orientation guide*. (Technical Report). Canandaigua, NY.

Kemp, J., & Bossarte, R. (2012). *Suicide Data Report, 2012* (Department of Veterans Affairs Mental Health Services Suicide Prevention Program). Washington, DC: Office of Public and Intergovernmental Affairs.

Kessler, R. C., Borges, G., & Walters, E. E. (1999). Prevalence of and risk factors for lifetime suicide attempts in the national comorbidity survey. *Archives of General Psychiatry*, *56*(7), 617–626. doi:10.1001/archpsyc.56.7.617

Knox, K. L., Litts, D. A., Talcott, G. W., Feig, J. C., & Caine, E. D. (2003). Risk of suicide and related adverse outcomes after exposure to a suicide prevention programme in the US Air Force: Cohort study. *BMJ*, *327* (7428), 1376. doi:10.1136/bmj.327.7428.1376

LeardMann, C. A., Powell, T. M., Smith, T. C., Bell, M. R., Smith, B., Boyko, E. J., … Hoge, C. W. (2013). Risk factors associated with suicide in current and former US military personnel. *JAMA*, *310*(5), 496–506. doi:10.1001/jama.2013.65164

Lineberry, T. W., & O'Connor, S. S. (2012). Suicide in the US Army. *Mayo Clinic Proceedings*, *87*(9), 871–878. doi:10.1016/j.mayocp.2012.07.002

Linehan, M. M. (1993). *Cognitive-behavioral treatment of borderline personality disorder*. New York, NY: Guilford.

Linehan, M. M., Comtois, K. A., Murray, A. M., Brown, M. Z., Gallop, R. J., Heard, H. L., … Lindenboim, N. (2006). Two-year randomized controlled trial and follow-up of dialectical behavior therapy vs therapy by experts for suicidal behaviors and borderline personality disorder. *Archives of General Psychiatry*, *63*(7), 757–766.

McCarthy, J. F., Valenstein, M., Kim, H. M., Ilgen, M., Zivin, K., & Blow, F. C. (2009). Suicide mortality among patients receiving care in the Veterans Health Administration health system. *American Journal of Epidemiology*, *169*(8), 1033–1038. doi:10.1093/aje/kwp010

McIntosh, J. L., & Drapeau, C. W. (2012). *U.S.A. suicide 2010: Official final data*. American Association of Suicidology. Retrieved from http://www.suicidology.org

Monteith, L. L., Menefee, D. S., Pettit, J. W., Leopoulos, W. L., & Vincent, J. P. (2013). Examining the interpersonal–psychological theory of suicide in an inpatient veteran sample. *Suicide and Life-Threatening Behavior*, *43*(4), 418–428. doi:10.1111/sltb.12027

Nademin, E., Jobes, D. A., Pflanz, S. E., Jacoby, A. M., Ghahramanlou-Holloway, M., Campise, R., … Johnson, L. (2008). An investigation of

interpersonal-psychological variables in air force suicides: A controlled-comparison study. *Archives of Suicide Research*, *12*(4), 309–326. doi:10.1080/13811110802324847

National Action Alliance for Suicide Prevention: Clinical Care & Intervention Task Force. (2011). *Suicide care in systems framework*. Available at http://actionallianceforsuicideprevention.org/sites/actionallianceforsuicideprevention.org/files/taskforces/ClinicalCareInterventionReport.pdf

Nock, M. K., Deming, C. A., Fullerton, C. S., Gilman, S. E., Goldenberg, M., Kessler, R. C., … Ursano, R. J. (2013). Suicide among soldiers: A review of psychosocial risk and protective factors. *Psychiatry*, *76*(2), 97–125. doi:10.1521/psyc.2013.76.2.97

Nordstrom, P., Samuelsson, M., & Asberg, M. (1995). Survival analysis of suicide risk after attempted suicide. *Acta Psychiatrica Scandinavica*, *91* (5), 336–340.

Qin, P., & Nordentoft, M. (2005). Suicide risk in relation to psychiatric hospitalization: evidence based on longitudinal registers. *Archives of General Psychiatry*, *62*(4), 427–432. doi:10.1001/archpsyc.62.4.427

Rudd, M. D., Joiner, T. E., Trotter, D., Williams, B., & Cordero, L. (2008). The psychological and behavioral treatment of suicidal behavior: A critique of what we know (and what we don't). In P. Kleespies (Ed.), *Evaluating and managing behavioral emergencies: An evidence based resource for the mental health practitioner* (pp. 339–350). Washington, DC: American Psychological Association.

Schoenhard, W. (2011, April 18). Suicide rates among utilizers of VHA health care services: New data from 2008 [Memorandum]. Available at http://www.namicalifornia.org/webbdata/NEWSVIEWS-DTD-2011-05/va%20releases%20memo/suicide%20rates%20among%20utilizers%20of%20vha%20health%20care%20services_eng.pdf

Sher, L., & Yehuda, R. (2011). Preventing suicide among returning combat veterans: A moral imperative. *Military Medicine*, *176*(6), 601–602.

Van Orden, K., Witte, T. K., Cukrowicz, K. C., Braithwaite, S. R., Selby, E. A., & Joiner, T. E., Jr. (2010). The interpersonal theory of suicide. *Psychological Review*, *117*(2), 575–600. doi:10.1037/a0018697

World Health Organization. (2013). Suicide Prevention (SUPRE). Retrieved 11/20/2013, 2013, from http://www.who.int/mental_health/prevention/suicide/suicideprevent/en/

Xu, J., Kenneth, M., Kochanek, D., Sherry, M., & Murphy, L. (2010). *Deaths: Final data for 2007* (National Vital Statistics Reports, Vol. 58, No. 19). Washington, DC: U.S. Department of Health and Human Services.

Suicide and Life-Threatening BEHAVIOR
THE OFFICIAL JOURNAL OF THE AMERICAN ASSOCIATION OF SUICIDOLOGY

DOI: 10.1111/sltb.12073

Suicide Risk among Lesbian, Gay, Bisexual, and Transgender Military Personnel and Veterans: What Does the Literature Tell Us?

Bridget B. Matarazzo, PsyD, Sean M. Barnes, PhD, James L. Pease, PhD, Leah M. Russell, MA, Jetta E. Hanson, MA, Kelly A. Soberay, MA, and Peter M. Gutierrez, PhD

Research suggests that both the military and veteran and the lesbian, gay, bisexual, and transgender (LGBT) populations may be at increased risk for suicide. A literature review was conducted to identify research related to suicide risk in the LGBT military and veteran populations. Despite the paucity of research directly addressing this issue, themes are discussed evident in the literature on LGBT identity and suicide risk as well as LGBT military service members and veterans. Factors such as social support and victimization appear to be particularly relevant. Suggestions are made with respect to future research that is needed on this very important and timely topic.

While serving in the U.S. military has historically been regarded as a protective factor against mortality (Rothberg, Bartone, Holloway, & Marlowe, 1990; Kang & Bullman, 1996), recent evidence (e.g., Army Suicide Prevention Task Force, 2010) suggests this may no longer be accurate as it relates to death by suicide. Suicide has become a formidable problem among U.S. military personnel. Since the beginning of the conflicts in Iraq and Afghanistan, suicide rates have doubled among active-duty military members (Army Suicide Prevention Task Force, 2010). In 2008, the prevalence of suicide in the Army and Marines surpassed that of the age-adjusted general population for the first time (Army Suicide Prevention Task Force, 2010; Frueh & Smith, 2012). Suicide is now second only to unintended injury as cause of death in the U.S. military (Department of Defense Task Force on Prevention of Suicide by Members of the Armed Forces, 2010; Ritchie,

Bridget B. Matarazzo and Sean M. Barnes, Veterans Integrated Service Network (VISN) 19 Mental Illness, Research, Education and Clinical Center (MIRECC), Denver, CO, USA, and Department of Psychiatry, School of Medicine, University of Colorado, Denver, CO, USA; James L. Pease and Leah M. Russell, VISN 19 MIRECC, Denver, CO, USA; Jetta E. Hanson and Kelly A. Soberay, VISN 19 MIRECC, Denver, CO, USA, and Military Suicide Research Consortium (MSRC), Denver, CO, USA; Peter M. Gutierrez, VISN 19 MIRECC, Denver, CO, USA, Department of Psychiatry, School of Medicine, University of Colorado, Denver, CO, USA, and MSRC, Denver, CO, USA.

This article is based on work supported, in part, by the Department of Veterans Affairs, but does not necessarily represent the views of the Department of Veterans Affairs, the Department of Defense, or the U.S. Government. This work was supported, in part, by grants awarded to the Denver VA Medical Center by the Department of Defense. The Department of Defense had no further role in the study design; in the collection, analysis, and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication. Denver VA Medical Center Grant Number: W81XWH-10-2-0178.

Address correspondence to: Bridget B. Matarazzo, VISN 19 MIRECC, 1055 Clermont Street, Denver, CO 80220; E-mail: Bridget.Matarazzo@va.gov

Keppler, & Rothberg, 2003). Although there is evidence to suggest that veteran suicide rates are decreasing in recent years, suicide among veterans continues to surpass rates of the general population, with males aged 30 to 64 at the highest risk (Blow et al., 2012). One reaction to this growing prevalence has been increased research on the risk factors for suicide, identification of at-risk subpopulations, and the development of suicide prevention interventions.

One population within the military that has the potential to be particularly vulnerable to suicide, but that has not been the focus of much research, is the lesbian, gay, bisexual, and transgender (LGBT) community.[1] For close to half a century, reports have documented the elevated risk for suicide among LGBT populations (Haas et al., 2011), and epidemiological studies have provided evidence that the LGBT community is at an increased risk for suicide and self-directed violent behaviors (Garofalo, Wolf, Wissow, Woods, & Goodman, 1999; King et al.,2008; Remafedi, French, Story, Resnick, & Blum, 1998). Nevertheless, there is no consistent and reliable way to determine the prevalence of suicide among this population because death records do not routinely record sexual orientation (Haas et al., 2011). Psychological autopsy has been used to capture death by suicide and sexual orientation, but increased death rates among LGBT populations were not found in these studies (McDaniel, Purcell, & D'Augelli, 2001; Renaud, Berlim, Begolli, McGirr, & Turecki, 2010; Shaffer, Fisher, Hicks, Parides, & Gould, 1995). The results should be regarded as tentative due to small sample sizes and underreporting by those interviewed. One study that used Danish registries to examine same-sex partnership and death by suicide did find that individuals with same-sex partnership were 3 to 4 times more likely to die by suicide than married heterosexual individuals (Qin, Agerbo, & Mortensen, 2003).

Although it cannot be determined unequivocally that death by suicide is higher among the LGBT community, the relationship between attempted suicide and sexual orientation has been established in population-based studies in the United States and worldwide (Cochran & Mays, 2000; Fergusson, Horwood, Ridder, & Beautrais, 2005; Mathy, 2002a). Discrepancies in prevalence vary, but among adults who reported same-sex behavior, rates of attempted suicide have been consistently found to be between three and five times higher than those who never reported same-sex behavior (Cochran & Mays, 2011; Paul et al., 2002). In addition, there have been reports that combine ideation and attempts, with important differences by gender. Gay and bisexual women have reported much higher rates of suicidal ideation, and gay and bisexual men have reported significantly higher suicide attempt rates (King et al., 2008).

Fewer data are available on death by suicide and suicidal ideation and behaviors among the transgender population (Mathy, 2002b). Some data exist that suggest death by suicide and suicide attempts are much higher in individuals who have had sex reassignment surgery (Dixen, Maddever, Van Maasdam, & Edwards, 1984; Pfäfflin & Junge, 1998). However, a review of consequences of sex reassignment in Europe found that suicide attempts and suicidal ideation may decrease from 20% before surgery to a much lower rate (0.5–1.9%) after (Michel, Ansseau, Legros, Pitchot, & Mormont, 2002). Factors associated with being at risk for suicidal thoughts and behavior in the transgender population

[1]The terms *lesbian*, *gay*, and *bisexual* refer to one's sexual identity, whereas *transgender* refers to gender identity or expression. Of note, the authors use the term *LGBT community* to broadly refer to the heterogeneous group of individuals who identify as LGBT, knowing that there are many distinct communities within this larger group. Specifically, LGBT individuals are included in the same acronym when appropriate and at other times are differentiated (e.g., LGB) to accurately reflect the terminology used in the literature.

include common risk factors, such as substance abuse, depression, and anxiety (Clements-Nolle, Marx, & Katz, 2006; Xavier, Honnold, & Bradford, 2007), as well as job-related stressors (National Center for Transgender Equality & the National Gay & Lesbian Task Force, 2009). Evidence suggests that certain risk factors are specific to transgender individuals, including a history of forced sex, gender-based discrimination and victimization (Clements-Nolle et al., 2006), and rejection by their family of origin (Grossman & D'Augelli, 2008).

Given these findings, being a member of the U.S. military, as well as identifying as LGBT, could potentially constitute a double-edged risk for suicide. At the time of this writing, the authors of this paper were only able to identify two studies regarding suicide risk among LGBT military personnel. The paucity of research on the LGBT community within the U.S. military is understandable given the military's historical policies with respect to gays and lesbians serving in the military. The repeal in 2011 by President Obama of the Don't Ask Don't Tell policy (Policy Concerning Homosexuality in the Armed Forces, 2004) presents an opportunity to examine risk among sexual minority military personnel and explore ways to optimize their well-being and functioning. In this article we review the existing literature on the LGBT community and suicide as well as the LGBT community within the military. A conceptualization regarding the implications of these findings for military personnel is offered, gaps in the literature are identified, and recommendations for future research are discussed.

METHODS

Search Strategy for the Identification of Relevant Studies

A broad search strategy for potential articles was used. Electronic searches were completed using PubMed, ERIC, Sociological Abstracts, Social Work Abstracts, and PsychInfo. Search terms were identified across three different content areas: LGBT identity, suicide, and the military. Combinations of the following terms were searched: gay, lesbian, bisexual, transgender, homosexual, transsexual, suicid*, military, and veteran. Terms related to LGBT identity, the military, and suicide were searched as a triad, terms related to LGBT identity and suicide were searched as a dyad, and terms related to LGBT identity and the military were also searched as a dyad. Each database was independently searched by two team members utilizing the entire search strategy. Any unique results yielded were included in an EndNote database.

Abstract and Full-Text Review

After duplicate articles were removed, team members reviewed all abstracts in the EndNote database. Articles were included if they were published in a peer-reviewed journal in the English language, the main focus of the article was on adults (the review only included studies in which participants' mean age was at least 18 years old), and content was related to either: LGBT identity, the military, and suicide; or LGBT identity and the military; or LGBT identity and suicide. Articles were excluded if they focused on nonsuicidal self-directed violence or did not report original research (e.g., literature reviews, opinion papers). The articles that met these criteria were divided among the team for full-text review. Articles were then removed if upon full-text review, they did not meet criteria as outlined above.

Synthesis of the Literature

Relevant information (e.g., abstract, results, recommendations) from each remaining original research article was entered into an Access database. Each research team member reviewed this information for each article to identify themes in

the literature. Team members met to discuss themes present in the literature and decided on the most common and relevant themes to the topic area.

RESULTS

The initial search yielded 3,810 abstracts. Following the removal of duplicate articles and those that did not meet inclusion or exclusion criteria, 187 abstracts remained. After the full-text review of these 187 articles, 117 original research articles were available for analysis. The primary reasons for exclusion were that the article did not report original research or that the primary content of the article was not related to the required content categories. The final 117 articles were classified into three groups based on content area: LGBT identity, suicide, and the military (n = 1); LGBT status and suicide (n = 95); and the military and LGBT status (n = 21). While searching for supporting literature, one additional original research article was identified after the initial search was conducted. This article was specifically related to LGBT identity, suicide, and military. Results from the body of literature are presented in narrative form. Information regarding prevalence data and risk and protective factors is described.

Prevalence of Suicidal Ideation and Behavior among the LGBT Population

Numerous articles reported the prevalence of suicidal thoughts and behaviors among LGBT individuals (see Table 1 for U.S. studies). These rates differed somewhat across samples and study methodologies, but all studies reported noteworthy rates of suicidal ideation and attempts among LGBT individuals. Two studies reported findings specifically related to sexual minority veterans and suicidal ideation and attempts. Blosnich, Bossarte, and Silenzio (2012) found that 11.48% of sexual minority veterans reported that they had seriously considered attempting suicide within the past year, whereas only 3.48% of heterosexual veterans reported having seriously considered attempting suicide during the past year. Herrell et al. (1999) analyzed national data from the vietnam Era Twin Registry and reported that among veterans who had at least one same-gendered sexual partner in their lifetime, 55.3% reported suicidal ideation compared to 25.2% of those with no reported same-gender partners. Among veterans with at least one same-gender partner, 14.7% reported that they had attempted suicide compared to 3.9% of veterans with no same-gender partner.

In addition to these two studies specifically focused on LGB veterans, the search yielded multiple studies related to LGBT samples that were not specified as military or veteran. Most U.S. studies found that approximately 40% of LGB participants reported a lifetime history of suicidal ideation. Lifetime suicidal ideation was reported by 41% to 43% of mixed LGBT participant samples (Garcia, Adams, Friedman, & East, 2002; McBee-Strayer & Rogers James, 2002); approximately 41% of gay males (Balsam, Beauchaine, Mickey, & Rothblum, 2005; Cochran & Mays, 2000); 38% to 57% of lesbian women (Balsam, Beauchaine, et al., 2005; Bradford, Ryan, & Rothblum, 1994); and 31% to 39% of bisexual individuals (Balsam, Beauchaine, et al., 2005). Fifty to 64% of transgender individuals reported a lifetime history of suicidal ideation (Imbimbo et al., 2009; Kenagy & Bostwick, 2005). In keeping with these high rates of suicidal ideation, when prevalence across studies was examined, a mean of approximately 17% of LGB participants reported having attempted suicide (e.g., Balsam, Beauchaine, et al., 2005; Balsam, Rothblum, & Beauchaine, 2005; Remafedi, 2002). Transgender individuals generally reported a higher prevalence of suicide attempts, with approximately 30% having attempted suicide (Clements-Nolle, Marx, Guzman, & Katz, 2001; Kenagy, 2005; Kenagy & Bostwick, 2005).

TABLE 1
Prevalence of Suicidal Thoughts and Behaviors among U.S .Samples

Study	Participants	Design	Prevalence
Mixed samples			
Balsam, Beauchaine, et al. (2005)	533 heterosexual, 558 lesbian or gay, and 163 bisexual individuals approximate *M* age = 35	LGB individuals were recruited via convenience sampling and then they recruited their siblings. Questionnaires completed via the mail.	History of suicidal ideation (≥ age 18): 41.1% of gay men, 31.4% bisexual men, 38.4% lesbian women, and 39.3% bisexual women. History of suicide attempt (≥ age 18): 10.5% of gay men, 11.4% bisexual men, 7.9% lesbian women, and 10.7% bisexual women.
Blosnich and Bossarte (2012)	11,046 LGB, unsure, and heterosexual college students ages 18–24; *M* = 20.1	Self-report, national college health assessment (NCHA)	History of suicidal ideation (past year): 15% gay or lesbian, 21% bisexual, and 5.5% heterosexual. History of suicide attempt (past year): 3.3% gay or lesbian, 4.6% bisexual, and 0.9% heterosexual.
Blosnich et al. (2012)	61 LGB veterans, 1,639 heterosexual veterans ages 18–64+	Statewide survey conducted in Massachusetts that contained questions about history of active-duty status, LGBT identity, and suicidal ideation	11.48% of LGB veterans reported serious suicidal ideation within past year. 3.48% of heterosexual veterans reported serious suicidal ideation within past year.
Bolton and Sareen (2011)	34,653 LGB, unsure, and heterosexual individuals age ranges by group: 20 to 39, 40 to 55, and 56 and older	Lay interviewers: National Epidemiologic Survey on Alcohol and Related Conditions	History of suicide attempt (lifetime): 9.8% gay men, 10% bisexual men, 8.5% unsure men, 2.1% heterosexual men; 10.9% lesbian women, 24.4% bisexual women, 9.9% unsure women, and 4.2% heterosexual women.
D'Augelli and Grossman (2001)	416 LGBT individuals ages 60–91; *M* = 68.5	Snowball sampling via LGB agencies and groups for older adults	13% reported a past suicide attempt (lifetime).

(continued)

TABLE 1
(continued)

Study	Participants	Design	Prevalence
Garcia et al. (2002)	138 LGBT college students, ages 18–30	Cross-sectional survey; college students	43% of respondents reported past SI, 11% reported a past suicide attempt (lifetime).
Hershberger et al. (1997)	194 lesbian or gay youth group members ages 15–21; $M = 18.86$	Survey; convenience sample Brief Symptom Inventory #9 asked about suicidal ideation	42% reported at least one lifetime suicide attempt. 39% reported suicidal thinking in the past week.
House, Van Horn, Coppeans, and Stepleman (2011)	1,126 LGBT individuals ages 18–80; $M = 37.6$	Internet-based survey	23.7% attempted suicide at least once (lifetime). 26.7% of female participants attempted suicide (lifetime). 34.8% of transgender participants attempted suicide (lifetime). 17.7% of male participants attempted suicide (lifetime).
McBee-Strayer and Rogers James (2002)	162 LGB individuals ages 18–64	Self-report surveys The Suicide Behavior Questionnaire	91% reported a history of suicidal ideation (lifetime). 37% reported a history of suicide attempt (lifetime).
Meyer, Dietrich, and Schwartz (2008)	388 LGB individuals ages 18–59	World Health Organization World Mental Health Survey Initiative of the Composite International Diagnostic Interview	7.9% of gay or lesbian participants made a lifetime suicide attempt. 10.0% of bisexual participants had made a lifetime suicide attempt.
Needham and Austin (2010)	11,153 LGB and heterosexual individuals ages 18–26	In-home interviews conducted in 2 waves with students as part of the Add Health Study	Suicidal ideation reported in the past year: 21% of lesbian women 17% of gay men 18% of bisexual females 13% of bisexual men

(continued)

TABLE 1
(continued)

Study	Participants	Design	Prevalence
Russell et al. (2011)	245 LGBT individuals ages 21–25	Participants recruited from 249 LGBT venues (e.g., organizations, bars, clubs). Young adult survey from The Family Acceptance Project composed of self-report scales.	41% reported history of lifetime suicide attempt. 22% needed medical attention after a suicide attempt.
Gay and bisexual men			
Berg, Mimiaga, and Safren (2008)	92 gay and bisexual men ages 18–58; *M* = 35.6	Chart review of intake procedures and assessments at an LGBT health clinic	18.5% reported suicidal ideation at time of intake.
Kipke et al. (2007)	526 gay, bisexual, and questioning men ages 18–24	Self-report surveys	10% reported they had seriously considered suicide (past 12 months). 4% reported that they had developed a plan (past 12 months). 4% reported that they had attempted suicide (past 12 months).
Paul et al. (2002)	2,881 urban gay and bisexual men ages 18–86; *M* = 37	A probability sample was interviewed over the phone	21% had made a suicide plan (lifetime). 12% had attempted suicide (lifetime).
Schneider, Taylor, Hammen, Kemeny, and Dudley (1991)	778 bisexual and gay males *M* age = 36	Multicenter AIDS Cooperative Study; questionnaire received by mail and returned to study site	27% reported suicidal ideation in the past 6 months.
Gay men			
Herrell et al. (1999)	4,774 male–male twin pairs of Vietnam Era veterans; those who had a same-gender partner and those who had not (No age reported)	Interview as part of the Harvard Twin Study of Substance Abuse, which included 4 questions from the Diagnostic Interview Schedule-III Revised	14.7% with any same-gender partners (whose twin did not have any same-gender partners) attempted suicide (lifetime). 55.3% reported suicidal ideation (lifetime).

(continued)

TABLE 1
(continued)

Study	Participants	Design	Prevalence
Remafedi (2002)	255 gay men ages 16–25; *M* = 20	Structured clinical interview in popular venues	34% reported a history of lifetime suicide attempt. 4.7% reported an attempt in the past year. 19% reported suicidal ideation in the past month.
Lesbian or bisexual women			
Bradford et al.(1994)	1,925 lesbian women ages 17–80; 80% were between 25 and 44 years of age	Surveys were sent to lesbian and gay health and mental health organizations and practitioners across the country. Snow-ball sampling was also used.	43% indicated they never had thought about suicide, 35% reported rarely, 19% sometimes, 2% reported often having suicidal thoughts; 18% had attempted suicide (lifetime).
Corliss et al. (2009)	1,253 lesbian or bisexual women *M* age = 40	Surveys completed by women who identified as lesbian, bisexual, or reported being sexually active or attracted to other women. Multiple-participant recruitment methods were used (e.g., outreach at gay community events).	10.2% reported a history of suicide attempt prior to age 18.
Matthews, Hughes, Johnson, Razzano, and Cassidy (2002)	550 lesbian women *M* age = 43	Surveys were sent to participants as part of the Chicago Lesbian Community Cancer Project. Questionnaire contained questions related to mental and physical health.	51% had seriously considered suicide (lifetime). 22% reported a lifetime suicide attempt.
Morris et al. (2001)	2,401 lesbian women ages 15–83; *M* age = 36	National Lesbian Wellness Survey data	21.5% reported a lifetime suicide attempt. 46% reported lifetime suicidal ideation.
Transgender individuals			

(continued)

TABLE 1
(continued)

Study	Participants	Design	Prevalence
Clements-Nolle et al.(2001)	523 transgender individuals, male to female and female to male median age: 34 for male to female (range 18–67), 36 for female to male (range 19–61)	Recruitment conducted in neighborhoods identified to have a high concentration of transgender persons. Trained transgender interviewers, included physical and mental health measures.	32% of both male to female and female to male individuals reported a lifetime history of suicide attempt.
Imbimbo et al. (2009)	139 transgender (male to female) individuals who had undergone sex reassignment surgery *M* age = 31.36	Questionnaire 12–18 months after surgery	50% contemplated suicide (lifetime). 2% attempted suicide (pre-surgery). 0.7% attempted suicide (postsurgery).
Kenagy (2005)	182 transgender individuals male to female and female to male age 17–68	Face-to-face interview and self-report	30.1% had attempted suicide (lifetime). 2 or 3 said they attempted due to being transgender.
Kenagy and Bostwick (2005)	111 transgender individuals male to female and female to male ages 19–70	Self-report, structured interview	64% had thought about suicide (lifetime). 60% reported having these thoughts due to being transgender. 27% had attempted suicide (lifetime). 52% reported attempting suicide due to being transgender.
Nuttbrock et al. (2010)	571 transgender individuals male to female ages 19–59	Recruited from streets, clubs, organizations, and advertising. Self-report, structured interview.	For ages 19–39 (lifetime): 53.0% had thought about suicide 34.9% had planned for suicide 31.2% had attempted suicide For ages 39–59 (lifetime): 53.5% had thought about suicide 34.9% had planned for suicide 28.0% had attempted suicide

L = lesbian, G = gay, B = bisexual, T = transgender, *M* = mean.

Many studies also compared the prevalence of suicidal thoughts and behaviors between LGBT and heterosexual populations. The research shows that LGBT populations are at elevated risk of suicide relative to heterosexual populations. Blosnich and Bossarte (2012) analyzed a representative sample of 11,046 college-attending 18- to 24-year-olds and found significantly more LGB students reported suicidal ideation (gay or lesbian = 15%, bisexual = 21%) and suicide attempts (gay or lesbian = 3.3%, bisexual = 4.6%) within the past year than heterosexual students (ideation = 5.5%, attempts = 0.9%). Needham and Austin (2010) analyzed follow-up data from 11,153 participants (18–26 years old) initially recruited in a nationally representative U.S. school-based study. They also found significantly greater rates of suicidal ideation among LGB participants. Approximately 21% of lesbians, 17% of gay males, 18% of bisexual females, and 13% of bisexual males endorsed seriously considering suicide within the past year, whereas only 6.3% of heterosexual females and 5.7% of heterosexual males reported seriously considering suicide. Finally, Bolton and Sareen (2011) analyzed data from 34,653 respondents to the National Epidemiologic Survey on Alcohol and Related Conditions, a representative probability survey of U.S. civilians. Gay and bisexual men had approximately a fourfold increase in suicide attempts after controlling for demographic variables. Similarly, lesbian women evidenced a nearly threefold increase in risk and bisexual women had approximately a sixfold greater risk. No studies comparing prevalence of suicidal ideation or behavior within the transgender population to the general population were identified.

Some evidence suggests that bisexual individuals may be particularly at risk for suicide. After controlling for mental disorders, Bolton and Sareen (2011) found that bisexual men and women still demonstrated a threefold increase in risk and were the only groups that significantly differed from heterosexuals. Steele, Ross, Dobinson, Veldhuizen, and Tinmouth (2009) analyzed data from a Canadian national population-based survey including 354 lesbian, 424 bisexual, and 60,937 heterosexual women. Bisexual women were significantly more likely than lesbian and heterosexual women to report lifetime suicidal ideation.

Suicide Risk and Protective Factors Identified in the Literature

The present literature review identified one study related to suicide risk factors specific to LGB individuals who have served in the military. Blosnich et al. (2012) found that sexual minority veterans had significantly less social and emotional support and higher rates of suicidal ideation than heterosexual veterans. Although this literature search only identified one study specific to the LGB military or veteran populations, there are numerous studies that identify risk factors associated with LGBT identity and self-directed violence in the general population. A summary of these studies is provided as well as an elaboration on two specific factors that are well documented in the literature identified for this article: victimization and social support.

Results of some international studies suggest that sexual minority identity is a greater risk factor for men than women (Fergusson et al., 2005; de Graaf, Sandfort, & Have, 2006). For example, de Graaf et al. (2006) found a stronger association between suicidality (i.e., ideation and behavior) and sexual orientation among men than women, particularly after controlling for psychiatric conditions. However, results regarding the potential moderating effect of gender have not been entirely consistent (Van Heeringen & Vincke, 2000).

In addition to gender, trauma, mental health disorders, and substance use have all been associated with suicide. Although these risk factors are shared both by LGBT individuals and those who identify as heterosexual, the prevalence of these risk factors is elevated among the LGBT community. With regard to mental health disorders, mul-

tiple large scale surveys found elevated rates of mental disorders, including substance use disorders, among the LGBT community (Conron, Mimiaga, & Landers, 2010; Fergusson et al., 2005; Gilman et al., 2001). For example, King et al. (2008) reported that depression, anxiety, and substance use disorders are 1.5 times more common in the LGBT community. There is also a large body of evidence suggesting that members of the LGBT population who have experienced physical, sexual, and emotional trauma are at increased risk for suicide (Balsam, Rothblum, et al., 2005; Botnick et al., 2002; Paul et al., 2002). Literature providing evidence of the relationship between victimization and suicide risk is elaborated on below.

The current literature search yielded no studies exploring protective factors among the LGBT military or veteran populations. In fact, little research has been conducted in the general LGBT population on factors that protect this community from suicide. One study found that social norms, high levels of support, identification with role models, and high self-esteem help protect gay men from suicide (Fenaughty & Harre, 2003). Another study reports that support within the lesbian community is considered a protective factor (Bradford et al., 1994). Literature related to the construct of social support and its impact on suicide risk is also more fully discussed.

Victimization and Suicide Risk. Twenty-six articles retrieved discussed the relationship between victimization and suicide risk within the LGBT community. For example, Rivers and Cowie (2006) reported that 53% of their LGB sample reported suicidal or self-harm ideation as a direct result of victimization related to sexual orientation and 40% had attempted suicide or self-harm for the same reason. Some researchers suggest that sexual minority identity is not an independent risk factor for suicide; rather, the outcomes of socially based stressors such as bullying strengthen the risk (Blosnich & Bossarte, 2012). Russell, Ryan, Toomey, Diaz, and Sanchez (2011) found that LGBT young adults who reported a high level of victimization during adolescence were 5.6 times more likely to have attempted suicide than those who reported a low level of victimization. Additional research found that higher rates of gender abuse among male-to-female transgender individuals were significantly associated with suicidality. This relationship varied across the life span such that it declined postadolescence and strengthened again in middle age. Importantly, gender abuse significantly decreased over the life span, but continued to be associated with significant levels of suicidality (Nuttbrock et al., 2010). Other research showed that lesbian and bisexual women reporting antigay harassment and maltreatment were more likely than those without these experiences to report that they had attempted suicide before 18 years of age (Corliss, Cochran, Mays, Greenland, & Seeman, 2009). However, victimization does not always lead to psychological distress. Reduction in self-esteem may impact this relationship such that if self-esteem is not reduced as a result of bullying, psychological distress and suicidal thoughts and/or behaviors may not occur (Waldo, Hesson-McInnis, & D'Augelli, 1998). Research suggests, however, that low self-esteem often occurs in the context of social discrimination (e.g., Huebner, Rebchook, & Kegeles, 2004), perhaps making this relationship likely. The majority of these studies focused on verbal abuse. However, it is important to note that other research also found that a history of suicide attempt was reported more frequently among adults who were physically attacked than those who were verbally victimized because of their sexual orientation (D'Augelli & Grossman, 2001).

Victimization in the LGBT Military Community. Our literature review also yielded studies that specifically relate to victimization of LGBT individuals who served in the military. The experience of LGBT individuals in the military is likely not well documented in the literature because of past regulations (e.g., the Don't Ask Don't Tell policy; Policy Concerning Homosexuality

in the Armed Forces, 2004), but a study exploring the experiences of lesbians being removed from the Canadian military showed psychological distress upon being sought out, which was likened to a "witch hunt" (Poulin, Gouliquer, & Moore, 2009; p. 498). High rates of LGBT harassment are also reported in the U.S. armed forces (Bowling, Firestone, & Harris, 2005). Not surprisingly, LGBT military members reported the negative impact of sexual orientation-based harassment. Moradi (2009) found that sexual orientation-based harassment is significantly associated with decreased social cohesion and task cohesion among U.S. military veterans (Moradi, 2009). Another study conducted by Moradi and Miller (2010) reported that a main reason why veterans of the wars in Iraq and Afghanistan supported policy banning openly gay or lesbian military personnel was because the veterans feared that this group would face harassment and bullying from other military personnel.

Social Support and Suicide Risk. The present review of the literature yielded one study that discussed social support and suicide risk in the LGB veteran population and 15 in the general LGBT population. Results presented provide evidence that factors related to social support are associated with risk for suicidal ideation and attempts. Blosnich et al. (2012) found that increased rates of suicidal ideation among sexual minority veterans were explained by poor mental health and decreased social and emotional support. With respect to the non-military or veteran population, Botnick et al. (2002) found that among a sample of gay and bisexual men, those who had attempted suicide reported significantly lower levels of social support than those who had not attempted suicide. Van Heeringen and Vincke (2000) reported that rating of homosexual friendships as unsatisfactory was associated with a history of suicide attempt.

The literature also provided evidence that factors related to the experience of coming out to family and friends appear to impact suicide risk. Research provides evidence that disclosing sexual orientation can be protective. In a study of lesbian and bisexual women, being "out" was negatively related to psychological distress, which was positively related to suicidal ideation and attempts (Morris, Waldo, & Rothblum, 2001). Moradi (2009) found that veterans who had disclosed their sexual orientation while in the military perceived higher social cohesion within their units. While this study did not assess suicide risk per se, increased social cohesion may be protective against self-directed violence as social support has been found to be protective (Botnick et al., 2002). While coming out in general may be protective, the reactions of friends impact suicide risk as well. In a study of gay youth, those who had lost friends due to disclosing their sexual orientation were three times more likely to report a suicide attempt than those who had not lost a friend in the coming out process (Hershberger, Pilkington, & D'Augelli, 1997).

DISCUSSION

In this review we aimed to identify literature related to suicide within the LGBT military and veteran populations. Research suggests that active-duty service members (Army Suicide Prevention Task Force, 2010) and veterans receiving care through the Veterans Health Administration (VHA; e.g., Blow et al., 2012; McCarthy et al., 2009) are at increased risk for suicide. The literature search conducted for the present review confirmed that the LGBT community is at increased risk for suicide as well, with rates of suicidal thoughts and behaviors generally exceeding those of the heterosexual community. Additionally, two articles were identified that provided data suggesting increased prevalence of suicidal ideation and attempts in LGB veterans. No studies related to transgender veterans and suicide risk were found.

This literature begs the question, *Why are LGBT military personnel and veterans potentially at increased risk for suicide?* The results of the literature search provide evidence with respect to risk and protective factors within the general LGBT community that help shed light on this question. Evidence suggests that risk factors, such as mental health disorders and substance abuse, are important for both the general population and LGBT communities. The body of literature identified focused on two risk factors that appear to be particularly relevant to suicide risk in the LGBT population: victimization and decreased social support. Decreased social support and worse mental health were specifically identified as risk factors for LGB veterans (Blosnich & Bossarte, 2012). Importantly, these factors explained the relationship between LGB identity and suicide risk such that LGB identity alone was not shown to be a risk factor.

Joiner's (2005) Interpersonal-Psychological Theory of Suicidal Behavior (IPTS) offers a framework from which to understand how the two important risk factors identified in the LGBT literature (i.e., victimization and social support) may help further explain suicide risk in the LGBT military and veteran populations. This theory purports that a person is at increased risk for suicide if they have acquired the capability to kill themselves and have the desire to die. Acquired capability is described as habituation that can occur in the context of past self-injury, pain, and/or other injury (Joiner, 2005). The theory holds that the presence of two constructs, perceived burdensomeness and failed belongingness, results in the desire for death. Perceived burdensomeness exists when one sees themselves as a permanent burden to others. One has a sense of failed belongingness when they do not feel that they belong to any community or have connections with others (Joiner, 2005).

The research identified in this review relates to two of the three constructs that comprise Joiner's (2005) theory. Data demonstrating that a history of victimization places LGBT individuals at increased risk for suicide can be understood with respect to acquired capability for lethal self-harm. People who identify as members of sexual minority communities report experiencing more abuse than their heterosexual counterparts because of the societal stigma they experience. This can result in increased exposure, and potentially habituation to, physical and psychological pain. Furthermore, research findings suggest that veterans with experiences in combat are at increased risk for suicide as compared to those who have not served in combat, which may relate to acquired capability gained from combat (Kleespies et al., 2011). Thus, LGBT military service members and veterans may already be at increased risk of acquired capability related to military combat and/or training and further habituation to pain via experiences of victimization.

Additionally, research supports that another important suicide risk factor for LGBT individuals, and LGB veterans specifically, is decreased social support. In the context of Joiner's (2005) theory, decreased social support can be understood as a manifestation of a crucial ingredient for the desire for death (i.e., failed belongingness). Thus, the literature provides some indirect support for the applicability of this component of the IPTS. Belongingness is a particularly important consideration for the LGBT military and veteran populations as unit cohesion is such an important component of military service. Lesbian, gay, bisexual, and transgender military service members' sense of belongingness may be impacted by their experience of coming out in the military. It is unknown how this experience may or may not be impacted by the recent repeal of the Don't Ask Don't Tell policy. It is recommended that future research explores the impact that coming out in the military has on suicide risk.

The literature identified in this review does not, however, provide information regarding perceived burdensomeness, the other factor that contributes to the

desire for death, in the LGBT military and veteran populations specifically or the broader LGBT population. Perceived burdensomeness was found to be positively correlated with suicidal ideation among a sample of military personnel who had been deployed (Bryan, Ray-Sannerud, Morrow, & Etienne, 2012) and thus may be a construct of interest to those trying to understand suicide risk among the LGBT military and veteran populations. An important step for researchers is to explore whether LGBT military service members or veterans who are at risk for suicide also have higher rates of perceived burdensomeness. This can be assessed via the Interpersonal Needs Questionnaire (Van Orden, Witte, Gordon, Bender, & Joiner, 2008). Thus, the IPTS offers a conceptualization of the research reported in this article, but no empirical evidence supports this understanding.

In addition to conducting future research to explore the applicability of IPTS to this population, the field would benefit greatly from more research regarding the prevalence of suicidal ideation and attempts in the LGBT military and veteran populations. Specifically, research focused on suicide risk among transgender service members and veterans is needed. Additionally, no research was identified that reports data related to suicide death among the LGBT military or veteran communities. Along with prevalence research, it would be beneficial to assess when suicide attempts occur with respect to military service (i.e., before, during, or after) as most studies have only collected data on lifetime history of suicide attempts. Research regarding the lethality of attempts and nature of suicidal ideation is also of interest. These data might provide the field with information regarding the impact of military service on suicide risk in this population. Additionally, researchers should work to identify risk and protective factors that may be unique to the LGBT military and veteran populations. Research in this area may be facilitated by the repeal of Don't Ask Don't Tell as service members and veterans may feel more comfortable to disclose their LGB identity. Research with transgender individuals who serve in the military, however, may continue to be challenged as the repeal of Don't Ask Don't Tell does not address this group. These are important first steps with respect to learning more about increased or unique risk associated with this population.

The research presented here should be considered with respect to some important limitations. For example, inconsistencies exist within the reviewed articles in regard to the methods of investigating suicidal behavior. The research assesses suicidal ideation and behavior with methods ranging from one to a few questions on each, with little consistency in the assessment methods or questions used. The time periods assessed vary between studies, with both recent and lifetime suicidal behavior explored, while rarely addressing persistent thoughts of suicide. Other methodological issues should be considered as well. Many studies employed biased sampling techniques that may limit the generalizability of the findings. For example, some studies only recruited from LGBT organizations and therefore may not be assessing individuals who choose to not affiliate with such groups. Inconsistent terminology regarding suicidal ideation and behavior and LGBT status is used throughout the research as well, which impacts the ability to accurately synthesize this body of literature. The literature reviewed utilized samples that included a wide range of ages. While an advantage of this is that many different age groups are represented, our methods employed do not allow for differentiation to be made as to how suicide risk may vary across age groups. Additionally, the definition of *sexual orientation* (e.g., behavior versus attraction) varies across studies, confounding our ability to compare between groups. Perhaps most importantly, it is entirely unclear how well research on the general LGBT population applies to experiences of the LGBT military or veteran populations. The expansion of research in this area is recommended and encouraged.

REFERENCES

Army Suicide Prevention Task Force. (2010). *Army health promotion, risk reduction, suicide prevention: Report 2010*. Washington, DC: Department of Defense.

BALSAM, K. F., BEAUCHAINE, T. P., MICKEY, R. M., & ROTHBLUM, E. D. (2005). Mental health of lesbian, gay, bisexual, and heterosexual siblings: Effects of gender, sexual orientation, and family. *Journal of Abnormal Psychology*, *114*, 471–476. doi:10.1037/0021-843X.114.3.471.

BALSAM, K. F., ROTHBLUM, E. D., & BEAUCHAINE, T. P. (2005). Victimization over the life span: A comparison of lesbian, gay, bisexual, and heterosexual siblings. *Journal of Consulting and Clinical Psychology*, *73*, 477. doi:10.1037/0022-006X.73.3.477.

BERG, M. B., MIMIAGA, M. J., & SAFREN, S. A. (2008). Mental health concerns of gay and bisexual men seeking mental health services. *Journal of Homosexuality*, *54*, 293–306. doi:10.1080/00918360801982215.

BLOSNICH, J., & BOSSARTE, R. (2012). Drivers of disparity: Differences in socially based risk factors of self-injurious and suicidal behaviors among sexual minority college students. *The Journal of American College Health*, *60*, 141–149. doi:10.1080/07448481.2011.623332.

BLOSNICH, J. R., BOSSARTE, R. M., & SILENZIO, V. M. B. (2012). Suicidal ideation among sexual minority veterans: Results from the 2005-2012 Massachusetts Behavioral Risk Factor Surveillance Survey. *American Journal of Public Health*, *102*, S44–S47. doi:10.2105/AJPH.2011.300565

BLOW, F. C., BOHNERT, A., ILGEN, M. A., IGNACIO, R., MCCARTHY, J. F., VALENSTEIN, M. M., ET AL. (2012). Suicide mortality among patients treated by the veterans health administration from 2000 to 2007. *American Journal of Public Health*, *102*, S98–S104. doi:10.2105/AJPH.2011.300441.

BOLTON, S. L., & SAREEN, J. (2011). Sexual orientation and its relation to mental disorders and suicide attempts: Findings from a nationally representative sample. *Canadian Journal of Psychiatry*, *56*, 35–43.

BOTNICK, M. R., HEATH, K. V., CORNELISSE, P. G., STRATHDEE, S. A., MARTINDALE, S. L., & HOGG, R. S. (2002). Correlates of suicide attempts in an open cohort of young men who have sex with men. *Canadian Journal of Public Health*, *93*, 59–62.

BOWLING, K. L., FIRESTONE, J. M., & HARRIS, R. J. (2005). Analyzing questions that cannot be asked of respondents who cannot respond. *Armed Forces & Society*, *31*, 411–437. doi:10.1177/0095327X0503100305.

BRADFORD, J., RYAN, C., & ROTHBLUM, E. D. (1994). National lesbian health care survey: Implications for mental health care. *Journal of Consulting and Clinical Psychology*, *62*, 228–242. doi:10.1037/0022-006X.62.2.228.

BRYAN, C. J., RAY-SANNERUD, B., MORROW, C. E., & ETIENNE, N. (2012). Guilt is more strongly associated with suicidal ideation among military personnel with direct combat experience. *Journal of Affective Disorders*, *1–5*. doi:10.1016/j.jad.2012.11.044.

CLEMENTS-NOLLE, K., MARX, R., GUZMAN, R., & KATZ, M. (2001). HIV prevalence, risk behaviors, health care use, and mental health status of transgender persons: Implications for public health intervention. *American Journal of Public Health*, *91*, 915–921.

CLEMENTS-NOLLE, K., MARX, R., & KATZ, M. (2006). Attempted suicide among transgender persons: The influence of gender-based discrimination and victimization. *Journal of Homosexuality*, *51*, 53–69. doi:10.1300/J082v51n03_04.

COCHRAN, S. D., & MAYS, V. M. (2000). Lifetime prevalence of suicide symptoms and affective disorders among men reporting same-sex sexual partners: Results from NHANES III. *American Journal of Public Health*, *90*, 573–578.

COCHRAN, S. D., & MAYS, V. M. (2011). Sexual orientation and mortality among US men aged 17 to 59 years: Results from the National Health and Nutrition Examination Survey III. *American Journal of Public Health*, *101*, 1133–1138. doi:10.2105/AJPH.2010.300013.

CONRON, K. J., MIMIAGA, M. J., & LANDERS, S. J. (2010). A population-based study of sexual orientation identity and gender differences in adult health. *American Journal of Public Health*, *100*, 1953.

CORLISS, H. L., COCHRAN, S. D., MAYS, V. M., GREENLAND, S., & SEEMAN, T. E. (2009). Age of minority sexual orientation development and risk of childhood maltreatment and suicide attempts in women. *American Journal of Orthopsychiatry*, *79*, 511–521. doi:10.1037/a0017163.

D'AUGELLI, A. R., & GROSSMAN, A. H. (2001). Disclosure of sexual orientation, victimization, and mental health among lesbian, gay, and bisexual older adults. *Journal of Interpersonal Violence*, *16*, 1008–1027. doi:10.1177/088626001016010003.

Department of Defense Task Force on Prevention of Suicide by Members of the Armed Forces. (2010). *Executive summary*. Retrieved December 19, 2012, from http://www.health.mil/dhb/downloads/TaskForce2010/Suicide%20Prevention%20Task%20Force_EXEC%20SUM_08-20-10%20v6.doc. Published August 2010.

Dixen, J. M., Maddever, H., Van Maasdam, J., & Edwards, P. W. (1984). Psychosocial characteristics of applicants evaluated for surgical gender reassignment. *Archives of Sexual Behavior*, *13*, 269–276. doi:10.1007/BF01541653.

Fenaughty, J., & Harre, N. (2003). Life on the seesaw: A qualitative study of suicide resiliency factors for young gay men. *Journal of Homosexuality*, *45*, 1–22. doi:10.1300/J082v45n01_01.

Fergusson, D. M., Horwood, L. J., Ridder, E. M., & Beautrais, A. L. (2005). Sexual orientation and mental health in a birth cohort of young adults. *Psychological Medicine*, *35*, 971–981. doi:10.1017/S0033291704004222.

Frueh, B. C., & Smith, J. A. (2012). Suicide, alcoholism, and psychiatric illness among union forces during the U.S. Civil War. *Journal of Anxiety Disorders*, *26*, 769–775. doi.org/10.1016/j.janxdis.2012.06.006.

Garcia, J., Adams, J., Friedman, L., & East, P. (2002). Links between past abuse, suicide ideation, and sexual orientation among San Diego college students. *Journal of American College Health*, *51*, 9–14. doi:10.1023/A:1016204417910.

Garofalo, R., Wolf, C., Wissow, L. S., Woods, E. R., & Goodman, E. (1999). Sexual orientation and risk of suicide attempts among a representative sample of youth. *Archives of Pediatrics and Adolescent Medicine*, *153*, 487–493. doi:10-1001/pubs.Pediatr Adolesc Med.-ISSN-1072-4710-153-5-poa8293.

Gilman, S. E., Cochran, S. D., Mays, V. M., Hughes, M., Ostrow, D., & Kessler, R. C. (2001). Risk of psychiatric disorders among individuals reporting same-sex sexual partners in the National Comorbidity Survey. *American Journal of Public Health*, *91*, 933–939.

de Graaf, R., Sandfort, T. G. M., & Have, M. T. (2006). Suicidality and sexual orientation: Differences between men and women in a general population-based sample from the Netherlands. *Archives of Sexual Behavior*, *35*, 253–262. doi:10.1007/s10508-006-9020-z.

Grossman, A. H., & D'Augelli, A. R. (2008). Transgender youth and life-threatening behaviors. *Suicide and Life-Threatening Behavior*, *37*, 527–537.

Haas, A. P., Eliason, M., Mays, V. M., Mathy, R. M., Cochran, S. D., D'Augelli, A. R., et al. (2011). Suicide and suicide risk in lesbian, gay, bisexual, and transgender populations: Review and recommendations. *Journal of Homosexuality*, *58*, 10–51. doi:10.1080/00918369.2011.534038.

Herrell, R., Goldberg, J., True, W. R., Ramakrishnan, V., Lyons, M., Eisen, S., et al. (1999). Sexual orientation and suicidality: A co-twin control study in adult men. *Archives for General Psychiatry*, *56*, 867–874. doi:10.1001/archpsyc.56.10.867.

Hershberger, S. L., Pilkington, N. W., & D'Augelli, A. R. (1997). Predictors of suicide attempts among gay, lesbian, and bisexual youth. *Journal of Adolescent Research*, *12*, 477–497. doi:10.1177/0743554897124004.

House, A. S., Van Horn, E., Coppeans, C., & Stepleman, L. M. (2011). Interpersonal trauma and discriminatory events as predictors of suicidal and nonsuicidal self-injury in gay, lesbian, bisexual, and transgender persons. *Traumatology*, *17*, 75–85. doi:10.1177/1534765610395621.

Huebner, D. M., Rebchook, G. M., & Kegeles, S. M. (2004). Experiences of harassment, discrimination and physical violence among young gay and bisexual men. *American Journal of Public Health*, *94*, 1200–1203.

Imbimbo, C., Verze, P., Palmieri, A., Longo, N., Fusco, F., Arcaniolo, D., et al. (2009). A report from a single institute's 14-year experience in treatment of male-to-female transsexuals. *Journal of Sexual Medicine*, *6*, 2736–2745. doi:10.1111/j.1743-6109.2009.01379.x.

Joiner, T. (2005). *Why people die by suicide*. Cambridge: Harvard University Press.

Kang, H., & Bullman, T. (1996). Mortality among U.S. veterans of the Persian Gulf War. *New England Journal of Medicine*, *335*, 1498–1504.

Kenagy, G. (2005). Transgender health: Findings from two needs assessment studies in Philadelphia. *Health & Social Work*, *30*, 19–26. doi:10.1093/hsw/30.1.19.

Kenagy, G. P., & Bostwick, W. B. (2005). Health and social service needs of transgender people in Chicago. *International Journal of Transgenderism*, *8*, 57–66. doi:10.1300/J485v08n02_06.

King, M., Semlyen, J., Tai, S. S., Killaspy, H., Osborn, D., Popelyuk, D., et al. (2008). A systematic review of mental disorder, suicide, and deliberate self harm in lesbian, gay and bisexual people. *BMC Psychiatry*, *8*, 70. doi:10.1186/1471-244X-8-70.

Kipke, M. D., Kubicek, K., Weiss, G., Wong, C., Lopez, D., Iverson, E., et al. (2007). The health and health behaviors of young men who have sex with men. *Journal of Adolescent Health*, *40*, 342–350. doi:10.1016/j.jadohealth.2006.10.019.

Kleespies, P. M., AhnAllen, C. G., Knight, J. A., Presskreischer, B., Barrs, K. L., Boyd, B. L., et al. (2011). A study of self-injurious and suicidal behavior in a veteran population. *Psychological Services*, *8*, 236. doi:10.1037/a0024881.

Mathy, R. M. (2002a). Suicidality and sexual orientation in five continents: Asia,

Australia, Europe, North America, and South America. *International Journal of Sexuality and Gender Studies*, 7, 215–225. doi:10.1023/A:1015853302054.

MATHY, R. M. (2002b). Transgender identity and suicidality in a nonclinical sample: Sexual orientation, psychiatric history, and compulsive behaviors. *Journal of Psychology and Human Sexuality*, *14*, 47–65. doi.org/10.1300/J056v14n04_03.

MATTHEWS, A. K., HUGHES, T. L., JOHNSON, T., RAZZANO, L. A., & CASSIDY, R. (2002). Prediction of depressive distress in a community sample of women: The role of sexual orientation. *American Journal of Public Health*, *92*, 1131–1139. doi:10.2105/AJPH.92.7.1131.

MCBEE-STRAYER, S. M., & ROGERS, J. R. (2002). Lesbian, gay, and bisexual suicidal behavior: Testing a constructivist model. *Suicide and Life-Threatening Behavior*, *32*, 272–283. doi:10.1521/suli.32.3.272.22171.

MCCARTHY, J. F., VALENSTEIN, M., KIM, H. M., ILGEN, M., ZIVIN, K., & BLOW, F. C. (2009). Suicide mortality among patients receiving care in the Veterans Health Administration health system. *American Journal of Epidemiology*, *169*, 1033–1038. doi:10.1093/aje/kwp010.

MCDANIEL, J., PURCELL, D., & D'AUGELLI, A. R. (2001). The relationship between sexual orientation and risk for suicide: Research findings and future directions for research and prevention. *Suicide and Life-Threatening Behavior*, *31* (Suppl), 84–105. doi:10.1521/suli.31.1.5.84.24224.

MEYER, I. H., DIETRICH, J., & SCHWARTZ, S. (2008). Lifetime prevalence of mental disorders and suicide attempts in diverse lesbian, gay, and bisexual populations. *American Journal of Public Health*, *98*, 1004–1006. doi:10.2105/AJPH.2006.096826.

MICHEL, A., ANSSEAU, M., LEGROS, J. J., PITCHOT, W., & MORMONT, C. (2002). The transsexual: What about the future? *European Psychiatry*, *17*, 353–362. doi:10.1016/S0924-9338(02)00703-4.

MORADI, B. (2009). Sexual orientation disclosure, concealment, harassment, and military cohesion: Perceptions of LGBT military veterans. *Military Psychology*, *21*, 513–533. doi:10.1080/08995600903206453.

MORADI, B., & MILLER, L. (2010). Attitudes of Iraq and Afghanistan war veterans toward gay and lesbian service members. *Armed Forces and Society*, *36*, 397–419. doi:10.1177/0095327X09352960.

MORRIS, J. F., WALDO, C. R., & ROTHBLUM, E. D. (2001). A model of predictors and outcomes of outness among lesbian and bisexual women. *American Journal of Orthopsychiatry*, *71*, 61–71. doi:10.1037/0002-9432.71.1.61.

National Center for Transgender Equality and the National Gay and Lesbian Task Force. (2009). *National Transgender Discrimination Survey*. Retrieved January 1, 2013, from http://transequality.org/ Resources/Trans_Discrim_Survey.pdf.

NEEDHAM, B. L., & AUSTIN, E. L. (2010). Sexual orientation, parental support, and health during the transition to young adulthood. *Journal of Youth and Adolescence*, *39*, 1189–1198. doi:10.1007/s10964-010-9533-6.

NUTTBROCK, L., HWAHNG, S., BOCKTING, W., ROSENBLUM, A., MASON, M., MACRI, M., ET AL. (2010). Psychiatric impact of gender-related abuse across the life course of male-to-female transgender persons. *Journal of Sex Research*, *47*, 12–23. doi:10.1080/00224490903062258.

PAUL, J. P., CATANIA, J., POLLACK, L., MOSKOWITZ, J., CANCHOLA, J., MILLS, T., ET AL. (2002). Suicide attempts among gay and bisexual men: Lifetime prevalence and antecedents. *American Journal of Public Health*, *92*, 1338–1345. doi:10.2105/AJPH.92.8.1338.

PFÄFFLIN, F., & JUNGE, A. (1998). Sex reassignment. Thirty years of international follow-up studies. *International Journal of Transgenderism*. Retrieved from http://www.symposion.com/ijt/books/index.htm#Sex%20Reassignment.

Policy Concerning Homosexuality in the Armed Forces, 10 U.S.C. Section 654 (2004).

POULIN, C., GOULIQUER, L., & MOORE, J. (2009). Discharged for homosexuality from the Canadian military: Health implications for lesbians. *Feminism & Psychology*, *19*, 496–516. doi:10.1177/0959353509342772.

QIN, P., AGERBO, E., & MORTENSEN, P. B. (2003). Suicide risk in relation to socioeconomic, demographic, psychiatric, and familial factors: A national register-based study of all suicides in Denmark, 1981-1997. *American Journal of Psychiatry*, *160*, 765–772. doi:10.1176/appi.ajp.160.4.765.

REMAFEDI, G. (2002). Suicidality in a venue-based sample of young men who have sex with men. *Journal of Adolescent Health*, *31*, 305–310. doi:10.1016/S1054-139X(02)00405-6.

REMAFEDI, G., FRENCH, S., STORY, M., RESNICK, M. D., & BLUM, R. (1998). The relationship between suicide risk and sexual orientation: Results of a population-based study. *American Journal of Public Health January*, *88*, 57–60. doi:10.2105/AJPH.88.1.57.

RENAUD, J., BERLIM, M. T., BEGOLLI, M., MCGIRR, A., & TURECKI, G. (2010). Sexual orientation and gender identity in youth suicide victims: An exploratory study. *Canadian Journal of Psychiatry*, *55*, 29–34.

Ritchie, E. C., Keppler, W. C., & Rothberg, J. M. (2003). Suicidal admission in the United States military. *Military Medicine*, *168*, 177–181.

Rivers, I., & Cowie, H. (2006). Bullying and homophobia in UK schools: A perspective on factors affecting resilience and recovery. *Journal of Gay and Lesbian Issues in Education*, *3*, 11–43. doi:10.1300/J367v03n04_03.

Rothberg, J. M., Bartone, P. F., Holloway, H. C., & Marlowe, D. H. (1990). Life and death in the US Army. *Journal of the American Medical Association*, *264*, 2241–2244.

Russell, S. T., Ryan, C., Toomey, R. B., Diaz, R. M., & Sanchez, J. (2011). Lesbian, gay, bisexual, and transgender adolescent school victimization: Implications for young adult health and adjustment. *Journal of School Health*, *81*, 223–230. doi:10.1111/j.1746-1561.2011.00583.x.

Schneider, S. G., Taylor, S. E., Hammen, C., Kemeny, M. E., & Dudley, J. (1991). Factors influencing suicide intent in gay and bisexual suicide ideators: Differing models for men with and without human immunodeficiency virus. *Journal of Personality and Social Psychology*, *61*, 776–788. doi:10.1037/0022-3514.61.5.776.

Shaffer, D., Fisher, P., Hicks, R. H., Parides, M., & Gould, M. (1995). Sexual orientation in adolescents who commit suicide. *Suicide and Life-Threatening Behavior*, *25*, 64–71. doi:10.1111/j.1943-278X.1995.tb00491.x.

Steele, L. S., Ross, L. E., Dobinson, C., Veldhuizen, S., & Tinmouth, J. M. (2009). Women's sexual orientation and health: Results from a Canadian population-based survey. *Women and Health*, *49*, 353–367. doi:10.1080/03630240903238685.

Van Heeringen, C., & Vincke, J. (2000). Suicidal acts and ideation in homosexual and bisexual young people: A study of prevalence and risk factors. *Social Psychiatry and Psychiatric Epidemiology*, *35*, 494–499. doi:10.1007/s001270050270.

Van Orden, K. A., Witte, T. K., Gordon, K. H., Bender, T. W., & Joiner, T. E., Jr. (2008). Suicidal desire and the capability for suicide: Tests of the interpersonal-psychological theory of suicidal behavior among adults. *Journal of Consulting and Clinical Psychology*, *76*, 72. doi:10.1037/0022-006X.76.1.72.

Waldo, C. R., Hesson-McInnis, M. S., & D'Augelli, A. R. (1998). Antecedents and consequences of victimization of lesbian, gay, and bisexual young people: A structural model comparing rural university and urban samples. *American Journal of Community Psychology*, *26*, 307–334. doi:10.1023/A:1022184704174.

Xavier, J., Honnold, J., & Bradford, J. (2007). *The health, health-related needs, and lifecourse experiences of transgender Virginians*. Richmond: Division of Disease Prevention through the Centers for Disease Control and Prevention, Virginia Department of Health.

Manuscript Received: February 5, 2013
Revision Accepted: August 27, 2013

BRAIN INJURY

http://informahealthcare.com/bij
ISSN: 0269-9052 (print), 1362-301X (electronic)

Brain Inj, Early Online: 1–10
 DOI: 10.3109/02699052.2014.916419

informa
healthcare

Cross-cultural adaptation of the Window to Hope: A psychological intervention to reduce hopelessness among US Veterans with traumatic brain injury

Bridget B. Matarazzo[1,2], Adam S. Hoffberg[1], Tracy A. Clemans[1,2], Gina M. Signoracci[1,2], Grahame K. Simpson[3,4] & Lisa A. Brenner[1,5]

[1]Veterans Integrated Service Network (VISN) 19 Mental Illness Research, Education and Clinical Center (MIRECC), Denver, CO, USA, [2]Department of Psychiatry, School of Medicine, University of Colorado, Denver, CO, USA, [3]Liverpool Brain Injury Rehabilitation Unit, Liverpool Hospital, Sydney, Australia, [4]Ingham Institute of Applied Medical Research, Sydney, Australia, and [5]Departments of Psychiatry, Neurology, and Physical Medicine and Rehabilitation, School of Medicine, University of Colorado, Denver, CO, USA

Abstract

Primary objective: To conduct a cross-cultural adaptation of Window to Hope (WtoH), a treatment to reduce hopelessness after traumatic brain injury (TBI), from the Australian civilian context to that of US Veterans.
Research design: Three-stage mixed-methods approach.
Methods: Stage 1: Consensus conference with stakeholders to revise the manual. Stage 2: Pilot study of the revised manual with US Veterans to examine acceptability, feasibility and fidelity. Stage 3: Review of results with consensus conference attendees and further revisions.
Results: Stage 1: Conference attendees reached 100% consensus regarding changes made to the manual. Stage 2: Qualitative results yielded themes that suggest that participants benefitted from the intervention and that multiple factors contributed to successful implementation (Narrative Evaluation of Intervention Interview, User Feedback Survey-Modified, Post-Treatment Interviews). Therapists achieved 100% treatment fidelity. Quantitative results from the Client Satisfaction Questionnaire-8 suggest that the intervention was acceptable. Stage 3: The culturally adapted manual was finalized.
Conclusions: Results of this study suggest that the revised WtoH manual is acceptable and feasible. US therapists exhibited adherence to the protocol. The three-stage methodology was successfully employed to cross-culturally adapt an intervention that is well-suited for a Phase II randomized controlled trial among US military Veterans.

Keywords

Cognitive behaviour therapy, mental health, suicide prevention

History

Received 4 October 2013
Revised 3 February 2014
Accepted 15 April 2014
Published online 19 June 2014

Introduction

Since the commencement of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF), suicide rates have risen among all branches of the US military [1], with more than 1100 members of the Armed Forces dying by suicide between 2005–2009 [2]. Moreover, the suicide rate has more than doubled among active duty Army personnel during this same period of time [3].

In addition, OEF/OIF military personnel are sustaining traumatic brain injuries (TBI) secondary to combat exposure [4]. TBI is often described as a 'signature injury' of the OEF/OIF conflicts, with estimates suggesting that 8–20% of those who served have sustained a TBI [5]. Research also suggests that TBIs are common among Veterans from previous conflicts (e.g. Vietnam [6]).

Correspondence: Bridget Matarazzo, VISN 19 MIRECC, 1055 Clermont St., Denver, CO 80220, USA. Tel: 303-355-5372. E-mail: bridget.matarazzo@va.gov

Suicides after TBI have been documented among Veterans from successive armed conflicts since the First Word War [7–9]. Current reports continue to support that history of TBI is a risk factor for future suicidal behaviour [10, 11]. Seminal work by Teasdale and Engberg [11] suggested that civilian patients with a history of TBI were 2.7–4-times more likely to die by suicide when compared to members of the general population [11]. Similarly, growing evidence among the Veteran population confirms that there is a greater risk of death by suicide after TBI. In a large study of 7 850 472 Veterans receiving Veterans Health Administration (VHA) services, 49 626 Veterans were diagnosed with mild and moderate-to-severe TBI. Among this sub-set, death by suicide occurred at 1.98- (mild TBI) and 1.34- (moderate-to-severe TBI) times the rate of the general VHA population [10]. This significantly increased risk across all levels of TBI severity was identified after controlling for important confounding factors such as psychiatric diagnoses and demographics [10]. Despite the clinical seriousness of this problem, there are scarce evidence-based psychological or pharmacological interventions for mental health problems [12] or for suicide [13] among Veterans with TBI.

In the general population, hopelessness is an important and modifiable risk factor for suicide [14]. Specifically, research has found that hopelessness is a stronger predictor of suicide than depression itself [15, 16]. Among people with TBI, hopelessness is a strong predictor of suicidal ideation, with suicidal ideation a strong predictor of post-injury suicide attempts [17].

Window to Hope (WtoH), a cognitive-behavioural treatment programme, was devised to reduce hopelessness among people with severe TBI in the chronic phase of their injury (i.e. greater than 1 year). The programme was evaluated by means of a randomized controlled trial (RCT) [18]. The results of the trial were promising. The treatment group reported a significant reduction in hopelessness compared to a comparison group receiving standard care ($p = 0.002$). There was a strong treatment effect ($d = 1$), with the majority of participants maintaining or experiencing a further decrease in hopelessness at 3 months follow-up [18]. The trial was well designed, rated as at eight out of 10 on the PEDRO scale by the PsycBITE database [19]. As the only validated treatment that specifically targeted suicide risk after TBI [13], testing the efficacy of WtoH within the US Veteran context was considered an important priority.

There is broad international consensus for the importance of implementing evidence-based interventions to treat mental health problems after TBI [20]. However, there has been limited discussion about how this might be achieved at a country-by-country level. In most hierarchies of evidence, a single well-designed RCT is not sufficient grounds for establishing a 'practice standard' [21]. In the current replication process with US Veterans there were additional considerations. The original trial was conducted on a modest sample ($n = 17$), and among civilians recruited from a single rehabilitation service from another country. Therefore, the investigators deemed that a Phase II replication trial was an important intermediate step to broader implementation of WtoH within the US Veteran context.

Preliminary to the conduct of any such trial, the cross-cultural adaptation of the programme was crucial. Research suggests that mental health interventions may be more effective when they are adapted for a specific cultural group [22]. The current adaptation process involved two cross-cultural transitions, from a civilian to a military context and at a national cultural level, from an Australian to a US context.

Awareness and appreciation of military culture has been identified as critical to delivering mental health services to Veterans [23]. Specifically, those working with Veterans should be aware of how factors such as shared language, norms, values and training experiences may impact care [23, 24]. For example, skills taught within military culture tend to be 'specific, concrete and action oriented' ([25], p. 104). Bryan et al. [25] suggested that, similarly, suicide prevention-related strategies for this population should have the same characteristics and that patients should be taught not only what to do and when to do it, but also shown *how* to do it.

In terms of national cultural factors, Australian and US cultures have many etics (common factors) that facilitate cross-cultural adaptation. This is supported by their similar ratings on the United Nations Human Development Index (HDI) [26], one index of cultural proximity. Despite these common factors, there may be important emics (aspects unique to each culture) which could impact the successful implementation of the WtoH intervention. Thus, national cultural differences were also incorporated into the adaptation process.

To the best of the authors' knowledge, Gan et al. [27] provided the first detailed account of the adaptation of a psychological/psychosocial intervention programme across client groups (i.e. from adults to adolescents) in the field of acquired brain injury. The procedures devised by Gan et al. [27] provided the model for the current study.

Design

The cross-cultural adaptation of the WtoH intervention utilized a mixed-methods approach which was implemented across three distinct stages, as outlined in Figure 1. The first stage involved hosting a consensus conference, utilizing Nominal Group Technique (NGT) procedures (e.g. Larkins et al. [28]), in which key community stakeholders learned about the intervention and worked together to reach consensus regarding necessary modifications to the original WtoH treatment manual. The second stage of the cross-cultural adaptation included conducting four pilot groups with US therapists and Veterans and collecting baseline and follow-up data to assess the feasibility and acceptability of the revised WtoH intervention, as well as therapist adherence to the protocol (i.e. fidelity). Feasibility refers to the ease with which the intervention can be implemented, whereas acceptability refers to the sustainability of intervention [29]. Fidelity is the extent to which the intervention can be delivered as intended [29]. The pilot groups also provided the opportunity to fine tune the content and format of the adapted WtoH intervention [29]. During the third stage of the adaptation process, the authors re-convened by phone with the participants who attended the original consensus conference to review the results from Stages 1 and 2. During this stage, participants were also provided the opportunity to offer final feedback regarding the WtoH cross-cultural adaptation.

Stage 1: Expert consensus conference and revision of the original WtoH manual

Participants

In order to recruit diverse stakeholders to attend the consensus conference, the authors sought professionals familiar with Veterans, mental health and recovery models, rehabilitation and/or TBI. As suggested by Hussler et al. [30], members of the Veteran community were also included as participants. Ten individuals were invited and nine attended. Characteristics of the consensus conference attendees are presented in Table I. The developer of the original WtoH intervention (GKS) and the Veterans Integrated Service Network 19 Mental Illness Research, Education and Clinical Center (VISN 19 MIRECC) research staff (four psychologists and one research assistant) were also in attendance and one of the study psychologists (BBM) served as the moderator of the conference.

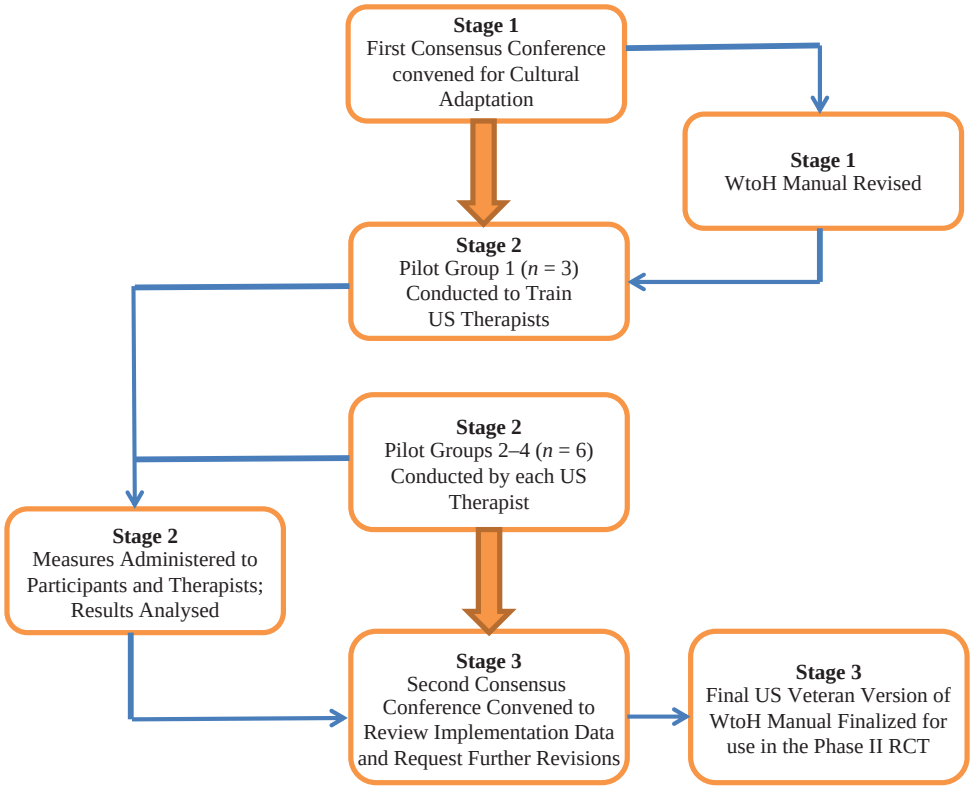


Figure 1. Three-stage study design.

Table I. Consensus conference participant characteristics.

Primary Expertise	VA Medical Center Service	Gender	Veteran status
Peer Support Specialist[a], TBI Survivor	Mental Health	Male	Veteran
Peer Support Specialist[a], Parent of TBI Survivor	Mental Health	Female	Veteran
Clinical Psychology	Mental Health	Female	Civilian
Clinical Psychology	VISN 19 MIRECC[b]	Female	Civilian
Rehabilitation Psychology	Spinal Cord Injury	Female	Civilian
Neuropsychology	Patient Focused Care	Female	Civilian
Neuropsychiatry	VISN 19 MIRECC[b]	Male	Civilian
Social Work	VISN 19 MIRECC[b]	Female	Civilian
Post-deployment Needs[c]	OEF/OIF/OND[c] Clinic	Male	Veteran

[a]Peer Support Specialist: A Veteran with a mental health and/or co-occurring condition who has real-world experience in helping other Veterans cope and identify recovery-related tools and resources.
[b]VISN 19 MIRECC: Veterans Integrated Service Network 19 Mental Illness Research, Education and Clinical Center.
[c]The OEF/OIF/OND (Operation Enduring Freedom/Operation Iraqi Freedom/Operation New Dawn) Clinic specializes in providing case management services to Veterans who were deployed to OEF/OIF/OND and focuses on post-deployment and transition-related issues.

Procedures

Attendees participated in a day-long consensus conference to adapt the WtoH treatment manual for the US Veteran population. Prior to the consensus conference, local Institutional Review Board (IRB) approval was obtained and each attendee was provided with relevant journal articles, the meeting agenda, charge for the day, a copy of the original WtoH manual and an initial list of suggested changes (described below) to the manual, as identified by research staff. To begin the consensus conference, attendees were introduced to one another and reminded of the day's agenda and the purpose of the meeting.

The following conference procedures were consistent with the NGT for conducting consensus conferences (e.g. Larkins et al. [28]). The moderator provided the attendees with a list of the 10 sessions included in the original WtoH intervention, which covers seven different topics (see Table II). Attendees were then asked, 'From your perspective as a provider, Veteran and/or family member, what topics related to Veterans with a history of TBI would be important to cover in the WtoH treatment?' Conference attendees were given time to individually brainstorm regarding any topics in addition to the original seven they thought may be important to include in the revised manual. Attendees ranked up to 10 topics that they felt were important to include in the adapted version of the manual. They were told that this list could include the original WtoH topics and/or any new topics they identified during brainstorming. Attendees wrote down desired topics on separate index cards, which were numbered 1–10, and did not include any identifying information on the cards in order to preserve anonymity.

Table II. Window to Hope session topics.

Session	Therapeutic principle	Goals
1. Getting started	Group formation	Group participants meet, introduce programme theme
2. Living a positive lifestyle	Behavioural activation	Examine relationship between affect and lifestyle factors
3. Thoughts and feelings	Socialization to CBT	Learn about the relationship between thoughts and feelings
4, 5. Take another look	Cognitive restructuring	Learn how cognitive restructuring can ameliorate distress
6, 7. Problem-solving	Problem-solving	Develop a systematic approach to solving problems
8. Problem-solving and recovery	Compensatory techniques	Develop skills to facilitate adjustment to the extent of post-injury recovery
9. Building hope	Relapse prevention: Post Traumatic Growth	Identify means of building hope after TBI, self-esteem
10. Building hope	Relapse prevention: Post Traumatic Growth	Making meaning of TBI, positive expectancy and building connections

Table III. Key changes made to the US veteran version of WtoH.

Australian Civilian Version	US Veteran Version
National Cultural Changes	
European spelling (e.g. realise)	American spelling (e.g. realize)
Australian food pyramid	US Department of Agriculture 'My Healthy Plate'
Australian Quit Line	US Smoking Cessation Hotline
Australian activities (e.g. netball)	American activities (e.g. football)
Australian phrases (e.g. 'having a good mortgage')	American phrases (e.g. 'being able to purchase a home')
Civilian to Veteran Cultural Changes	
Australian Civilian Version	US Veteran Version
Standard brief relaxation breathing exercises	Include common military experiences when teaching skills (e.g. refer to tactical breathing when teaching deep breathing)
'Hero' refers generally to people facing physical danger or taking on major social challenges (e.g. facing down discrimination)	Consider Veteran culture with word choice (e.g. how using the word 'hero' may impact Veterans)

Research staff collected all of the cards, then read aloud and recorded all #1 ranking responses, then all #2 responses and so on until all responses were read and recorded. The moderator then facilitated attendee discussion and clarification of the topics. Similar items were grouped together through this collaborative process. Prior to finalizing grouped response topics, the moderator checked with attendees to ensure that the wording of the topic accurately reflected the responses provided.

After the topics to include were agreed upon, the attendees discussed the order in which they should be presented within the manual. Finally, research staff reviewed and requested feedback regarding the suggested changes to the manual that were identified by the research team prior to the consensus meeting. These changes were related to word choice and images used in the manual and were based on identified differences between both military and civilian and Australian and US cultures. Attendees were then given the opportunity to suggest additional changes.

Results

Among the attendees, there was 100% consensus that all seven original WtoH topics should continue to be included in the cross-cultural adaptation of the intervention and that the topics should remain in the original order. Attendees also identified 12 additional topics for consideration. After discussing these topics, the attendees grouped them into the following six domains: psychoeducation, resources, family relationships, vocational assistance, distress tolerance and the role of medications. The attendees continued discussing each of these potential new topics for inclusion in the revised manual. To facilitate this discussion, additional information about the specific content of the WtoH sessions was provided (GKS). With this information, attendees reached 100% consensus that the suggested six domains should not be added to the revised WtoH treatment manual. Attendees agreed that the topics of psychoeducation and distress tolerance were adequately addressed in the manual; resources, vocational assistance and family relationships could easily be discussed in the context of the group if these topics arose; and the role of medications was beyond the scope of the intervention.

Following completion of the NGT procedures, research staff and conference attendees reviewed suggested changes to the treatment manual. Attendees concurred with the 10 idiosyncratic changes to wording and images suggested by the research staff. Attendees also identified 22 additional changes to be made that accounted for differences between both Australian and US culture and military and civilian culture. The key changes are provided in Table III. In summary, the changes reflected the replacement of idiosyncratic language with broad, inclusive wording that was more relevant to the US Veteran population. Of note, because the salience of the Veteran-specific changes will vary with respect to a participant's military experiences, they were not explicitly added to the worksheets in the participant manual, but will be suggested to the provider in the therapist manual.

Revision of the treatment manual

In preparation for Stage 2 of this study, the WtoH treatment manual was revised by the research team. Minutes taken from

the consensus conference were utilized to ensure that changes made reflected the consensus obtained during the initial conference.

Stage 2: Pilot groups: Examining feasibility, acceptability and fidelity

Participants

Prior to commencing recruitment, local IRB approval was obtained. Potential participants were recruited through the use of flyers that were distributed throughout the Department of Veterans Affairs Medical Center (VAMC) where the study took place and in the community. Presentations were also made to clinical staff at the VAMC for recruitment purposes. Screening procedures were utilized to determine eligibility status of potential participants based on the following criteria: age between 18–89; positive history of moderate and/or severe TBI per the Ohio State University TBI-Identification Method [31]; and no history of alcohol abuse within 7 days or non-alcohol substance abuse within 30 days of baseline assessment as identified on the MINI International Neuropsychiatric Interview (MINI) [32].

Thirty-two potential participants expressed interest in the study and were screened for the pilot groups. Twenty did not meet eligibility criteria. Of the 12 who met inclusion criteria, nine were consented (see Figure 2). The nine enrolled participants were all male with an average age of 54.4 years (range = 28–67 years). Eligible participants were enrolled in the study into groups of two or three Veterans each. These small groups were consistent with delivery of the original WtoH intervention and were conducted in such a manner to manage participants' potential difficulties with attention and cognitive fatigue. Limiting the group size also provided time to pace the rate at which new concepts were introduced and to ensure that each participant was able to understand key ideas.

Procedures

Four pilot groups were conducted utilizing the revised WtoH treatment manual. Prior to the commencement of each group, participants were screened and baseline data were collected. Pilot Group 1 was facilitated by GKS and provided training for the three US therapists, all Psychologists (BBM, TAC, GMS), who would deliver WtoH in the Phase II trial. Pilot Group 1 was delivered over 10 consecutive working days.

Pilot Groups 2–4 were facilitated individually by each study therapist who had been trained during Pilot Group 1. These groups were held twice a week for 5 weeks, for ~2 hours per session. Thus, all pilot group participants were offered the full 20 hours of the intervention. Pilot Group 1 was audio and video recorded for training purposes and Pilot Groups 2–4 were audio recorded for treatment fidelity purposes. Due to the condensed delivery adding to participant burden, Pilot Group 1 participants were also compensated for their time and travel to each session. Attendance logs were maintained to collect data regarding the feasibility of the intervention. Treatment fidelity was assessed for each session of Pilot Groups 2–4 through use of a Fidelity Rating Checklist created for the WtoH intervention by an independent rater (LAB). To further facilitate training and fidelity, LAB facilitated discussion and feedback as it related to the checklist.

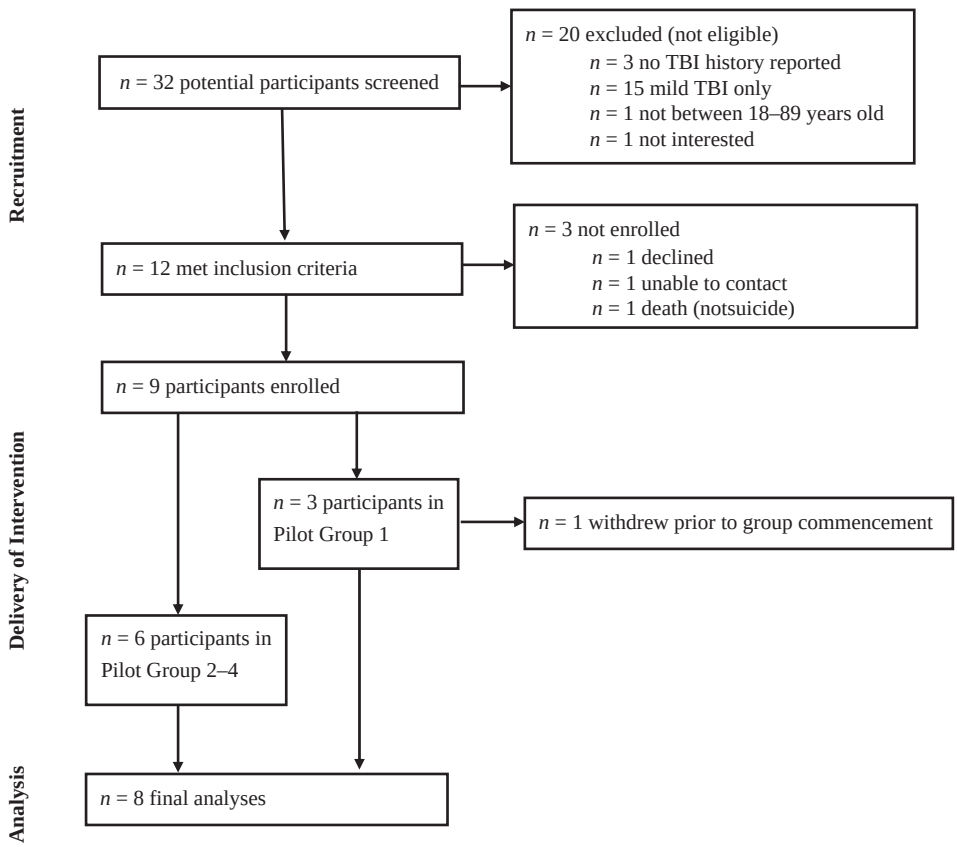


Figure 2. Stage 2 participant flow diagram.

Within 2 weeks of completion of the pilot groups, participants completed follow-up assessments related to the acceptability and feasibility of the intervention. Additionally, study therapists completed measures (i.e. User-Feedback Survey-Modified and Post-Treatment Interviews) also related to acceptability and feasibility. The results from one of the Post-Treatment Interviews was not correctly electronically saved and, thus, these data are missing from the results presented below.

Measures

Participant measures

Client Satisfaction Questionnaire-8 (CSQ-8 [33]). The CSQ-8 is an eight-item questionnaire that was used to assess participants' satisfaction with therapy at the post-treatment follow-up visit. Data from the CSQ-8 were used to inform the acceptability of the intervention to the participants as well as feasibility. This measure has been used frequently for evaluating standard community mental healthcare [33–35].

Narrative Evaluation of Intervention Interview (NEII [36]). The NEII, administered at the follow-up visit by research staff, is a 16-item semi-structured interview that is designed to help participants evaluate and describe the process and outcome of an intervention [36]. These data informed the acceptability of the intervention to participants in addition to feasibility. The NEII has been used to evaluate treatments for seriously mentally ill adults and has been shown to elicit participant responses regarding an intervention without referring to any expected outcome [37].

Therapist measures

User Feedback Survey–Modified (UFS-M [38]). A modified version of an existing user feedback survey [38] was used to obtain therapists' feedback regarding implementation of WtoH following Pilot Groups 2–4. These data were used to inform acceptability of the intervention to the therapists as well as feasibility. The study therapists responded to closed- and open-ended questions regarding their experience implementing WtoH.

Post-treatment interviews. Post-treatment interviews were conducted and transcribed by LAB at the end of Pilot Groups 2–4 to inform acceptability of the intervention to the therapists as well as feasibility. Study therapists were interviewed individually and asked about: (1) their general perception of WtoH; (2) barriers and facilitators to implementation; and (3) recommendations regarding possible revisions.

Fidelity rating checklist. The checklist was developed for the purpose of this study and was adapted from other commonly used fidelity rating scales, such as the Cognitive Therapy Scale [39]. The checklist was designed to capture therapists' adherence to two components of the intervention, content and process. Content refers to the topics and information included in the manual. Process was defined as facilitation of group discussion, participant learning and meaning making.

Analyses

Quantitative data was analysed descriptively. Responses to qualitative measures were reviewed by LAB. The responses were coded and universal themes were identified until the point of saturation was reached [40], such that no new themes were identified [41]. The identified themes are presented below.

Results

Acceptability

The data regarding the CSQ-8 is displayed in Table IV. Total scores can range from 8–32. The mean score from WtoH participants was 26.5 (SD = 4.44, Range = 17–30).

Responses on the NEII were typically brief in nature (e.g. a few words to one or two sentences). Analysis identified two primary themes in Veterans' responses to questions posed on the NEII, which suggested that they benefitted from the programme and were able to identify specific changes they made in response to treatment participation. One Veteran spoke about how he benefitted from the intervention's focus on hopelessness, noting that participating in the group gave him a 'better understanding of how to deal with hopelessness and that you just should not give up. That there is hope out there'. Another participant mentioned the following specific changes as a result of his experience of participating in the group, 'Change in my outlook of hopefulness, it make me more hopeful'. A third Veteran highlighted changes stating,

> It definitely helped me. It got me thinking on whole different levels. Before I started, I was all wound up and looking at things really one way. This programme you know I have been looking at things from a whole different perspective . . . I helped myself. That is the only way I can put it. I just look at myself differently. It made me feel better about myself.

Table IV. Client satisfaction questionnaire-8 results.

Item	Anchors	Range	Mean
Quality of Services	Excellent (4) to Poor (1)	3–4	3.75
Kind of Service	Yes, Definitely (4) to Definitely Not (1)	2–4	3.13
Needs Met	Almost All (4) to None (1)	1–3	2.63
Recommend to Friend	Yes, Definitely (4) to Definitely Not (1)	3–4	3.75
Help Satisfaction	Very Satisfied (4) to Quite Dissatisfied (1)	2–4	3.38
Deal with Problems	Great Deal (4) to Make Things Worse (1)	2–4	3.50
Overall Satisfaction	Very Satisfied (4) to Quite Dissatisfied (1)	2–4	3.13
Return to Program	Yes, Definitely (4) to Definitely Not (1)	2–4	3.25

Moreover, 'other than [one Veteran] remembering unpleasant situations' none of the programme elements were identified by the participants as being undesirable. No themes were identified with respect to Veterans not benefitting from the intervention.

The positive impact of WtoH was also noted by therapists on the UFS-M. The primary theme identified via analysis of the UFS-M responses reflected therapists' impressions that Veterans benefitted from the intervention and no contradictory themes were identified. For example, one therapist stated, 'Veterans appeared to benefit from problem-solving about their specific job situations. They appeared to experience relief and hope as a result'. Another therapist wrote,

> The participants seemed energized by the programme—one a generalized increase in hopefulness, the second more acceptance and normalizing that the memory difficulties he was experiencing were not a personal failing but a sequelae of the injury that he could start learning to live with.

Feasibility

During post-treatment interviews therapists noted a number of factors facilitating successful implementation and delivery of the programme, including the detailed manual, small group sizes and group interactions. Barriers included group members with differences in injury severity, inconsistent participant attendance; and some topic areas that were more abstract and existential in nature (e.g. overarching life goals and finding purpose in life) and seemingly difficult for participants to understand. One therapist also suggested that the order of the final two sessions should be switched to facilitate delivery of the intervention.

Themes identified on the UFS-M suggested that the therapists felt ease in delivering the intervention and no themes with respect to difficulty with delivery were discovered. For example, one of the therapists noted, 'Fairly easy treatment to administer once the therapist has gone through the protocol at least once'. Another wrote, 'I appreciate the structure of the model. I think it gives therapists clear objectives and guidance while also providing opportunities for therapists to respond to the group as needed'.

Participant responses to the NEII overwhelmingly indicated that they would recommend the programme to other Veterans. For example, one Veteran stated, 'If they have a head injury, I would surely recommend it [WtoH] because like I said the tools and the information that you get through the programme is really helpful'. Additionally, one item on the CSQ-8 asked participants if they would recommend the service to a friend if they were in need of similar help. The average response on this item was 3.75, with 3 indicating 'Yes, I think so' and 4 indicating 'Yes, Definitely'.

In terms of group attendance, nine participants initially enrolled in the pilot groups (three in Pilot Group 1 and two each in Pilot Groups 2–4; see Figure 1). One participant (from Pilot Group 1) withdrew from the study prior to the pilot group starting and, thus, did not complete the follow-up assessment. One participant (from Pilot Group 4) stopped attending group after three sessions, but did complete the follow-up assessment. The remaining seven participants had an attendance rate of 90% or higher across the 10 treatment sessions.

Fidelity

To assess adherence for Pilot Groups 2–4, each therapist's audio-taped sessions were reviewed by at least one other study therapist who completed the Fidelity Rating Checklist. Additionally, LAB also reviewed 30% of randomly sampled sessions. To achieve fidelity in a given session, the therapist was required to present each content-related item and exhibit each process-related behaviour listed on the checklist. Each therapist achieved 100% fidelity for each session of Pilot Groups 2–4. Finally, LAB and study therapists met weekly to discuss delivery of the intervention to ensure fidelity.

Stage 3: Final development of US Veteran version of WtoH treatment manual

Participants and procedures

Following completion of the pilot groups and collection of post-treatment data, a follow-up meeting to the original consensus conference was convened by phone to review the results from the pilot groups. All attendees from the consensus conference held during Stage 1 were invited to attend by phone. Three attendees from the initial consensus conference, plus six members of the WtoH research team attended the follow-up conference. During this meeting, previously agreed upon edits to the manual were presented along with pilot group acceptability, feasibility and fidelity results. Additionally, attendees were provided with the opportunity to suggest additional revisions to the treatment manual.

Results

One attendee suggested an additional modification to the treatment manual. Both the original and revised manual contained an Australian media story that was used by the therapist to facilitate a discussion on hope and self-esteem. The attendee suggested replacing the Australian media story with a US Veteran's story and specifically recommended utilizing the Department of Veteran's Affairs (VA) online resource, *Make the Connection* [42], which contains a video featuring a Veteran TBI survivor, for this purpose. Attendees reported 100% concurrence regarding the decision to replace the original media story and also agreed with all previous changes that had been made to content and formatting of the manual. The research team received permission to incorporate content from the *Make the Connection* website into the revised WtoH intervention manual.

Two additional modifications were made to the programme based on feedback provided by the therapists. First, the original WtoH manual utilized the saying, 'Stop, Revive, Survive' to teach participants how to increase positive self-talk (Session 4). Although this saying is well-known in Australia, it is not a saying that is familiar within US culture. Study therapists proposed that the saying, 'Stop, Drop and Roll' (a more culturally relevant US saying) be utilized

instead and all study team members agreed to make this modification for the RCT. Second, a key image utilized as a didactic device for Sessions 9–10 was upgraded. These accepted changes yielded a final version of the treatment manual to be implemented during the RCT with US Veterans.

Discussion

The present study utilized a rigorous mixed-methods approach to achieve the goal of developing a cross-cultural adaptation of the WtoH treatment. The findings suggest that the US Veteran adapted version of the WtoH intervention is acceptable and feasible to both US Veterans and VA treatment providers. Additionally, no significant cultural barriers with respect to the content of the treatment were identified. While the overall content of the programme remained the same, important idiosyncratic changes were made to increase the cultural relevance of the treatment to the US Veteran population. Results regarding fidelity to the treatment model suggest that the WtoH intervention can be successfully implemented by a variety of therapists in the VA setting, not just the developer of the intervention.

The implementation data obtained in this study suggested that the three-stage methodology employed was an effective procedure not only for culturally adapting the intervention, but also for providing data regarding implementation of the adaptation. Multiple stakeholders were included in the adaptation, which likely contributed to the success of the methodology. It has been suggested that, in conducting cross-cultural adaptations, researchers achieve a balance between meeting the needs of the population being served and the maintenance of scientific integrity through the inclusion of key stakeholders [43]. Of note, Veteran stakeholder input was obtained throughout the adaptation process. Veterans were involved as community stakeholders in the development of the adaptation and also as participants in the pilot groups.

The types of modifications that were made to the WtoH intervention also likely contributed to the success of the adaptation. The changes made were consistent with the need to include culturally relevant content while preserving the active components of the treatment, two aspects of cross-cultural adaptation highlighted in the literature. Research suggests that interventions adapted for specific populations are 4-times more effective than interventions that are provided to patients from a multitude of cultural backgrounds [22]. Cardemil et al. [44] highlight the importance of including culturally relevant content in mental health interventions. The authors note that, with CBT-based interventions, such as WtoH, this can be done through the inclusion of examples that are culturally relevant, rather than altering any of the key components of the intervention. Similarly, Zayas et al. [43] state that, when conducting cross-cultural adaptations, it is critical to maintain the active ingredients of the intervention that contribute to the mechanism of change. This study's focus on culturally relevant content in a manner that preserves the active treatment components has led to an adapted intervention that is believed to be well-suited for examining its efficacy in future trials to promote hope among US Veterans with a history of TBI. Despite that further changes were made to the manual during Stage 3 (after implementation data was collected), these changes do not alter the active components of the treatment and, thus, it is not expected that this would alter the implementation data.

The current study is not without limitations. Despite the inclusion of multiple stakeholder groups, not all stakeholders attended Stage 3 of the adaptation process. Importantly, the two Veteran stakeholders that attended the initial consensus conference were unable to attend the final meeting and, thus, were unable to provide feedback regarding the intervention modifications and pilot group results. Additionally, two factors may limit the generalizability of the results to the broader Veteran TBI population. First, the sample size of the pilot groups was small. Only 12 out of 32 potential participants met inclusion criteria, however the majority ($n = 18$) were excluded because they had no history of moderate or severe TBI. While this excludes potential participants representative of the broader TBI Veteran population, it includes those with moderate-to-severe TBI, whom the intervention was specifically developed for. Furthermore, the demographic composition of those included was similar to that of the general US Veteran population [45]. Second, the structure of the pilot groups with respect to the number and frequency of sessions varied across pilot groups and is different than how the intervention was originally designed to be delivered. The overall dose of treatment (i.e. 20 hours), however, was consistent across the original intervention, for all pilot groups. The Phase II RCT will provide the opportunity to address both of these factors as the sample size will be much larger and the number and frequency of sessions will be more consistent.

The results of this study encourage future research regarding the three-stage mixed methods procedure employed. Further data regarding the effectiveness of the methodology could be obtained by utilizing it in the cross-cultural adaptation of other interventions. Factors such as the type of intervention, the level of cultural proximity and type of implementation data obtained could all be explored. Additionally, the acquisition of data regarding the utility of the various components of the methodology (e.g. Nominal Group Technique, multiple stakeholders, anonymity, etc.) would facilitate further refinement of the methodology.

Having completed the cross-cultural process, the Phase II replication trial has commenced. To the best of the authors' knowledge, this will be the first time that a psychological intervention for a mental health issue after TBI will be replicated in a second trial. Given that the structure of the intervention was confirmed during the cross-cultural adaptation process and the evaluation protocol is almost identical, it provides a unique opportunity to pool the results from both studies once the current trial is completed. In addition to testing the efficacy of the intervention, the research team is continuing to administer implementation measures to gather more data regarding the feasibility, acceptability and fidelity of this revised intervention. These data will provide more evidence regarding this promising intervention aimed at reducing hopelessness in the high risk population of US Veterans with a history of TBI.

Declaration of interest

The views in this paper are those of the authors and do not necessarily represent the official policy or position of the Department of Veterans Affairs or the United States Government. This work was in part supported by the Military Suicide Research Consortium (MSRC), an effort supported by the Office of the Assistant Secretary of Defense for Health Affairs under Award No. (W81XWH-10-2-0178). Opinions, interpretations, conclusions and recommendations are those of the authors and are not necessarily endorsed by the MSRC or the Department of Defense.

References

1. Ramchand R, Acosta J, Burns RM, Jaycox LH, Pernin CG. The war within: Preventing suicide in the US military. Santa Monica, CA: RAND Corporation; 2011.
2. Department of Defense, Task Force on the Prevention of Suicide by Members of the Armed Forces. Executive Summary. Washington, DC: Department of Defense; 2010. Available online at: http://www.health.mil/dhb/downloads/Suicide%20Prevention%20Task%20Force%20final%20report%208-23-10.pdf, accessed 4 October 2013.
3. Army Suicide Prevention Task Force. Army health promotion, risk reduction, suicide prevention report, 2010. Washington, DC: Department of Defense; 2010.
4. Department of Defense. Defense Medical Surveillance System, Theater Medical Data Store: DoD Numbers for Traumatic Brain Injury – Total Worldwide Silver Springs, MD: TBI Diagnoses. 2013. Available online at: http://www.dvbic.org/dod-worldwide-numbers-tbi, accessed 4 October 2013.
5. Tanielian, T, Jaycox LH. Invisible wounds of war: Psychological and cognitive injuries, their consequences, and services to assist recovery. Santa Monica, CA: RAND Corporation; 2008.
6. Brenner LA, Homaifar BY, Olson-Madden JH, Nagamoto HT, Huggins J, Schneirder A, Forster JE, Matarazzo B, Corrigan JD. Prevalence and screening of traumatic brain injury among veterans seeking mental health services. Journal of Head Trauma Rehabilitation 2013;28:21–30.
7. Russell WR. Disability caused by brain wounds: A review of 1166 cases. Journal of Neurology, Neurosurgery & Psychiatry 1951;14:35–39.
8. Achte KA, Lonnqvist J, Hillbom E. Suicides following war brain-injuries. Acta Psychiatrica Scandinavica 1971;225(Suppl):1–94.
9. Carey ME, Young HF, Rish BL, Mathis JL. Follow-up study of 103 American soldiers who sustained a brain wound in Vietnam. Journal of Neurosurgery 1974;41:542–549.
10. Brenner LA, Ignacio RV, Blow FC. Suicide and traumatic brain injury among individuals seeking Veterans Health Administration services. Journal of Head Trauma Rehabilitation 2011;26:257–264.
11. Teasdale TW, Engberg AW. Suicide after traumatic brain injury: A population study. Journal of Neurology, Neurosurgery & Psychiatry 2001;71:436–440.
12. Matarazzo BB, Wortzel HS, Dorsey Holliman BA, Brenner LA. Evidence-based intervention strategies for Veterans and military personnel with traumatic brain injury and co-morbid mental health conditions: A systematic review. Brain Impairment 2013;14(Suppl 1):42–50.
13. Bahraini N, Simpson GK, Brenner LA, Hoffberg A, Schneider AL. Suicidal ideation and behaviours after traumatic brain injury: A systematic review. Brain Impairment 2013;14:92–112.
14. Mann JJ, Apter A, Bertolote J, Beautrais A, Currier D, Haas A, et al. Suicide prevention strategies: A systematic review. Journal of the American Medical Association 2005;294:2064–2074.
15. Beck AT, Steer RA, Kovacs M, Garrison B. Hopelessness and eventual suicide: A 10-year prospective study of patients hospitalized with suicidal ideation. American Journal of Psychiatry 1985;142:559–563.
16. Beck AT, Brown G, Steer RA. Prediction of eventual suicide in psychiatric inpatients by clinical ratings of hopelessness. Journal of Consulting & Clinical Psychology 1989;57:309–310.
17. Simpson GK, Tate RL. Suicidality after traumatic brain injury: Demographic, injury and clinical correlates. Psychological Medicine 2002;32:687–697.
18. Simpson GK, Tate RL, Whiting DL, Cotter RE. Suicide prevention after traumatic brain injury: A randomized controlled trial of a program for the psychological treatment of hopelessness. Journal of Head Trauma Rehabilitation 2011;26:290–300.
19. Psychological Database for Brain Impairment Treatment Efficacy. Syndney, Australia: PsycBITE. 2013. Available online at: http://www.psycbite.com/, accessed 4 October 2013.
20. Simpson GK, Tate RL, editors. State of the art reviews on mental health in traumatic brain injury. Brain Impairment 2013;14.
21. Cicerone KD, Dahlberg C, Kalmar K, Langenbahn DM, Malec JF, Bergquist TF, Felicetti T, Giacino JT, Harley JP, Harrington DE, Herzog J, Kneipp S, Laatsch L, Morse PA. Evidence-based cognitive rehabilitation: Recommendations for clinical practice. Archives of Physical Medicine & Rehabilitation 2000;81:1596–1615.
22. Griner D, Smith T. Culturally adapted mental health interventions: A meta-analytic review. Psychotherapy-Theory & Research 2006;43:531–548.
23. Strom TQ, Gavian ME, Possis E, Loughlin J, Bui T, Linardatos E, Leskela J, Siegel W. Cultural and ethical considerations when working with military personnel and Veterans: A primer for VA training programs. Training & Education in Professional Psychology 2012;6:67–75.
24. Rege MA, Etherage JR, Reger GM, Gahm GA. Civilian psychologists in an Army culture: The ethical challenge of cultural competence. Military Psychology 2008;20:21–35.
25. Bryan CJ, Jennings KW, Jobes DA, Bradley JC. Understanding and preventing military suicide. Archives of Suicide Research 2012;16:95–110.
26. Malik K. Summary: Human Development Report 2013. New York, NY: United Nations Development Programme; 2013.
27. Gan C, Gargaro J, Kreutzer JS, Boschen KA, Wright V. Development and preliminary evaluation of a structured family system intervention for adolescents with brain injury and their families. Brain Injury 2010;24:651–663.
28. Larkins BM, Worrall LE, Hickson LM. Stakeholder opinion of functional communication activities following traumatic brain injury. Brain Injury 2004;18:691–706.
29. Feeley N, Cossette S, Cote J, Heon M, Stremler R, Martorella G. The importance of piloting an RCT intervention. Canadian Journal of Nursing Research 2009;41:85–99.
30. Hussler C, Muller P, Ronde P. Is diversity in Delphi panelist groups useful? Evidence from a French forecasting exercise on the future of nuclear energy. Technological Forecasting & Social Change 2011;78:1642–1653.
31. Corrigan JD, Bogner J. Initial reliability and validity of the Ohio State University TBI Identification Method. Journal of Head Trauma Rehabilitation 2007;22:318–329.
32. Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E, et al. The Mini-International Neuropsychiatric Interview (M.I.N.I): The development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. Journal of Clinical Psychology 1998;59(Suppl 20):22–33.
33. Attkisson CC, Zwick R. The client satisfaction questionnaire. Psychometric properties and correlations with service utilization and psychotherapy outcome. Evaluation & Program Planning US Department of Veterans Affairs; Washington, DC 1982;5:233–237.
34. Gaston L, Sabourin S. Client satisfaction and social desirability in psychotherapy. Evaluation and Program Planning 1992;15:227–231.
35. Nguyen TD, Attkisson CC, Stegner BL. Assessment of patient satisfaction: Development and refinement of a service evaluation questionnaire. Evaluation and Program Planning 1983;6:299–313.
36. Hasson-Ohayon I, Roe D, Kravetz S. A qualitative approach to the evaluation of psychosocial intervention for persons with severe mental illness. Psychiatric Services 2006;3:262–273.
37. Roe D, Hasson-Ohayon I, Salyers MP, Kravetz S. A one year follow-up of illness management and recovery: Participants' accounts of its impact and uniqueness. Psychiatric Rehabilitation Journal 2009;32:285–291.

38. Webster CD, Martin ML, Brink J, Nicholls TL, Desmaris SL. 2009. Manual for the short-term assessment of risk and treatability (START) (Version 1.1 ed.). Coquitlam, Canada: BC Mental Health and Addiction Services.
39. Young JE, Beck AT. 1980. Cognitive Therapy Scale. Philadelphia, PA: University of Pennsylvania.
40. Rubin H, Rubin I. Qualitative interviewing: the art of hearing data. Thousand Oaks, CA: Sage Publications, Inc; 1995.
41. Guest G, Bunce A, Johnson L. How many interviews are enough?: An experiment with data saturation and variability. Field Methods 2006;18:59–82.
42. Department of Veterans Affairs. Make the Connection. 2013. Available online at: http://maketheconnection.net, accessed 9 September 2013.
43. Zayas LH, Bellamy JL, Proctor EK. 2012. Considering the multiple service contexts in cultural adaptations of evidence-based practices. In: Brownson RC, Colditz GA, Proctor EK, editors. Dissemination and implementation research in health: Translating science to practice. New York, NY: Oxford University Press; 483–497.
44. Cardemil EV, Kim S, Davidson T, Samriento IA, Ishikawa RZ, Sanchez M, Torres S. Developing a culturally appropriate depression prevention program: Opportunities and challenges. Cog and Beh Practice 2010;17:188–197.
45. VETPOP2011 Living Veterans by Age Group, Gender, 2010-2014; US Department of Veterans Affairs, Washington, DC. Available online at: http://www.va.gov/VETDATA/docs/Demographics/New_Vetpop_Model/1lVetPop11_National.xlsx, accessed 3 October 2013.

Journal of Affective Disorders 136 (2012) 743–750

Contents lists available at SciVerse ScienceDirect

Journal of Affective Disorders

journal homepage: www.elsevier.com/locate/jad

Research report

Sleep problems outperform depression and hopelessness as cross-sectional and longitudinal predictors of suicidal ideation and behavior in young adults in the military ☆

Jessica D. Ribeiro [a], James L. Pease [b,1], Peter M. Gutierrez [b,1], Caroline Silva [a], Rebecca A. Bernert [c], M. David Rudd [d], Thomas E. Joiner Jr. [a,*]

[a] Florida State University, United States
[b] VA VISN 19 MIRECC, Denver VA Medical Center, United States
[c] Stanford University, United States
[d] University of Utah, United States

ARTICLE INFO

Article history:
Received 23 June 2011
Received in revised form 25 August 2011
Accepted 28 September 2011
Available online 26 October 2011

Keywords:
Sleep
Insomnia
Suicide
Suicidal ideation
Depression
Hopelessness

ABSTRACT

Background: Sleep problems appear to represent an underappreciated and important warning sign and risk factor for suicidal behaviors. Given past research indicating that disturbed sleep may confer such risk independent of depressed mood, in the present report we compared self-reported insomnia symptoms to several more traditional, well-established suicide risk factors: depression severity, hopelessness, PTSD diagnosis, as well as anxiety, drug abuse, and alcohol abuse symptoms.

Methods: Using multiple regression, we examined the cross-sectional and longitudinal relationships between insomnia symptoms and suicidal ideation and behavior, controlling for depressive symptom severity, hopelessness, PTSD diagnosis, anxiety symptoms, and drug and alcohol abuse symptoms in a sample of military personnel (N = 311).

Results: In support of a priori hypotheses, self-reported insomnia symptoms were cross-sectionally associated with suicidal ideation, even after accounting for symptoms of depression, hopelessness, PTSD diagnosis, anxiety symptoms and drug and alcohol abuse. Self-reported insomnia symptoms also predicted suicide attempts prospectively at one-month follow up at the level of a non-significant trend, when controlling for baseline self-reported insomnia symptoms, depression, hopelessness, PTSD diagnosis and anxiety, drug and alcohol abuse symptoms. Insomnia symptoms were unique predictors of suicide attempt longitudinally when only baseline self-reported insomnia symptoms, depressive symptoms and hopelessness were controlled.

Limitations: The assessment of insomnia symptoms consisted of only three self-report items. Findings may not generalize outside of populations at severe suicide risk.

Conclusions: These findings suggest that insomnia symptoms may be an important target for suicide risk assessment and the treatment development of interventions to prevent suicide.

☆ This research was supported, in part, by grants awarded to the Denver VA Medical Center and to Florida State University by the Department of Defense. The Department of Defense had no further role in the study design; in the collection, analysis, and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication. The views and opinions expressed do not represent those of the Department of Veterans Affairs, the Department of Defense, or the United States Government.

* Corresponding author at: Florida State University, Tallahassee, Florida 32306-4301, United States.
E-mail address: joiner@psy.fsu.edu (T.E. Joiner).

[1] The views and opinions expressed do not represent those of the Department of Veterans Affairs or the United States Government.

0165-0327/$ – see front matter © 2011 Elsevier B.V. All rights reserved.
doi:10.1016/j.jad.2011.09.049

"In the states of depression in spite of great need for sleep, it is for the most part sensibly encroached upon; the patients lie for hours, sleepless in bed, … although even in bed they find no refreshment." Emil Kraepelin (1921)

1. Introduction

If asked to list the top few warning signs for imminent suicidal behavior, relatively few mental health professionals – even experienced ones; indeed even specialists – would list insomnia. But perhaps should, as mounting evidence makes clear (Ağargün and Cartwright, 2003; Bernert et al., 2005; Fawcett et al., 1990; Krakow et al., 2011; Turvey et al., 2002; Wojnar et al., 2009). Here, we extend this evidence by documenting robust links between sleep problems and suicidality, both cross-sectionally and longitudinally, and both with regard to suicidal ideation and suicidal behavior. Crucially, in all cases, we show that the links between sleep problems and suicidality exist beyond the involvement of factors mental health professionals *would* list as among the top few clinical risk indices for suicidality—namely, depression, hopelessness, PTSD, anxiety, and drug and alcohol abuse (Beck et al., 1990; Nock et al., 2010; Oquendo et al., 2002, 2004).

2. Why would sleep problems be involved in suicidality?

In the moments before their deaths, suicide decedents are almost never described by others as "sluggish" or "slowed down" – a perhaps surprising fact given the well-known association between depression – which can certainly slow people down – and suicidality. How are they usually described then? Descriptors of severe anxiety and terms such as "agitated," "on edge," and "keyed up" come up quite regularly (Busch and Fawcett, 2004; Hall et al., 1999). If others are queried about the days and nights preceding the death, another term is likely to surface: "sleepless" (Hall et al., 1999; McGirr et al., 2007; Tanskanen et al., 2001).

Suicide is inherently difficult because it requires overcoming basic self-preservation instincts (Joiner, 2005). This may be one factor that contributes to why decedents, in the moments before death, are rarely viewed as "sluggish" and are frequently viewed as "keyed up." Those whose death by suicide is imminent are physiologically aroused (Busch and Fawcett, 2004; Busch et al., 2003; Hall et al., 1999); were they not, something as daunting as death would likely be too difficult to enact. Indeed, many of them are physiologically *overaroused* (Busch and Fawcett, 2004; Busch et al., 2003; Kovasznay et al., 2004).

This state of overarousal appears to be a higher-order, underlying substrate with several manifest indicators, including various aspects of agitation and sleep disturbance. The focus in the current study is insomnia, which, for the purposes of this investigation, refers to a difficulty initiating or maintaining sleep that results in daytime consequences (e.g., fatigue). In this context, insomnia may be understood as one indicator of a psychological overarousal, which in turn may be associated with elevated risk for acute death by suicide. The emphasis of the current project is placed on insomnia not only because it is believed to be a key indicator of the overarousal, but also because it may be a clinically modifiable risk factor (Fawcett et al., 1990); furthermore, it is a topic many patients may be more likely to discuss with clinicians, in contradistinction to topics like suicidality and depression (Britt et al., 2008; Green-Shortridge et al., 2007; Hoge et al., 2004).

It is important to emphasize that the mechanisms underlying the relationship between insomnia symptoms and suicide remain unclear and under-researched. The overarousal hypothesis is offered as one potential explanation; however, there are a number of other possible explanatory pathways that might account for the link. Of note, there is some evidence to suggest that insomnia symptoms may impair decision making (Killgore et al., 2006), impulsivity (Schmidt et al., 2010), and exacerbate mood symptoms (Baglioni et al., 2010)—all of which may serve to mediate the relationship between insomnia symptoms and suicidal ideation and behavior.

3. Past research on sleep problems and suicidality

Despite the lack of theoretical research on why sleep would be associated with suicide risk, a growing body of evidence suggests that disturbed sleep may constitute an important, modifiable risk factor for suicide. Multiple sleep problems appear to predict elevated risk for suicide including insomnia, poor sleep quality, and nightmares (Ağargün and Cartwright, 2003; Ağargün et al., 1998; Bernert et al., 2005; Fawcett et al., 1990; Tanskanen et al., 2001). Supporting the construct validity of this association, this effect has been demonstrated controlling for depression, across diverse populations (*clinical, nonclinical*; Bernert et al., 2005, 2008), designs (*longitudinal, cross-sectional; epidemiologic, psychological autopsy studies*; Bernert et al., 2005; Bernert et al., 2007; Goldstein et al., 2008; Sabo et al., 1991), assessment techniques (*objective, subjective sleep indices*; Bernert et al., 2005; Goldstein et al., 2008; Sabo et al., 1991) and outcome measures (*suicide ideation, suicide death*; Ağargün et al., 1997a; Barraclough and Pallis, 1975; Bernert et al., 2007).

Of specific sleep disturbances that may increase suicidality, insomnia and its attendant fatigue have received the most research attention, but even so, there remain important research questions to address. Cross-sectionally, insomnia has repeatedly been linked to greater levels of suicidal ideation (Ağargün et al., 1997a; Barraclough and Pallis, 1975) even after controlling for depressive symptoms (Bernert et al., 2005, 2009; Chellappa and Araújo, 2007), and suicidal behavior (Goldstein et al., 2008; Sjöström et al., 2007). Longitudinal studies (though few) provide even more compelling evidence, indicating that insomnia emerges as a significant predictor of later suicidal ideation (McCall et al., 2010) and death by suicide (Fawcett et al., 1990; Fujino et al., 2005; Turvey et al., 2002).

4. The present study

In the current study, the literature on insomnia and suicidality is built upon. As can be discerned in Table 1, studies conducted to date vary considerably in terms of whether they examine suicidal ideation, behavior, or death by suicide as outcomes, whether they consider depression or other covariates, whether their assessment approach included multimethod features, and whether their designs incorporated cross-sectional or longitudinal elements. As Table 1 shows, no study did all of these. The present study is the first to do

Table 1
Past research on insomnia and suicidality.

	Dependent variable			Control variable		Design	
	Ideation	Behavior	Assessment method	Depression	Other	Cross-sectional	Longitudinal
Barraclough and Pallis (1975)		X	Suicide death			X	
Fawcett et al. (1990)		X	Suicide death				X
Ağargün et al. (1997a)	X		Schedule for Affective Disorders and Schizophrenia (SADS) Suicide Subscale			X	
Ağargün et al. (1997b)	X		SADS Suicide Subscale			X	
Turvey et al. (2002)		X	Suicide death				X
Smith et al. (2004)	X		Beck Depression Inventory (BDI)—Item 9	X		X	
Bernert et al. (2005)	X		Beck Scale for Suicidal Ideation (BSS)	X		X	
Fujino et al. (2005)		X	Suicide death				X
Ağargün et al. (2007)		X	Suicide attempt			X	
Chellappa and Araújo (2007)	X	X	Scale for Suicide Ideation (SSI)		X_a	X	
Sjöström et al. (2007)		X	Suicide Assessment Scale (SAS)			X	
Bernert et al. (2009)	X		BSS	X	X_b	X	
Wojnar et al. (2009)	X	X	The World Health Organization (WHO) Composite International Diagnostic Interview (CIDI)	X	X_c	X	
McCall et al. (2010)	X		SSI		X_d		X
Krakow et al., (2011)	X		Depressive Symptoms Inventory—Suicide Subscale (DSI-SS)	X		X	
Current study	X	X	Modified Scale for Suicidal Ideation (MSSI)	X	X	X	X

Note. a—controlled for antidepressant and hypnotic medication use; b—controlled for presence vs. absence of mental disorder and symptom severity; c—controlled for presence vs. absence of mental disorder, chronic health problems, and demographics; d—controlled for age, gender, treatment status, and baseline suicidality.

so. In addition, it is the first study to our knowledge that evaluates sleep disturbance in association with suicide risk in a military population.

Using archival data of a sample of young adults in the military referred for suicidality, the cross-sectional associations at baseline between insomnia symptoms and interviewer-assessed suicidal ideation are examined, controlling for hopelessness, depression, PTSD diagnosis, anxiety, drug abuse and alcohol abuse. A substantial subset of the participants was assessed one month later, allowing for the examination of longitudinal associations, between insomnia symptoms and suicidal ideation and behavior.

5. Method

5.1. Participants

Participants for this study included 311 individuals (255 men [82%]; 56 women), evaluated as they entered a study on the efficacy of treatments for suicidal young adults (Rudd et al., 1996). All participants were referred for severe suicidality from two outpatient clinics, an inpatient facility, and an emergency room. All facilities were affiliated with a major U.S. Army Medical Center. Approximately 40% had a diagnosis of major depressive disorder, 15% had a bipolar spectrum diagnosis (i.e. Bipolar I Disorder, Bipolar II Disorder, Cyclothymic Disorder, and Bipolar Disorder-Not Otherwise Specified), 13% had anxiety disorders, 5% had been diagnosed with a schizophrenia spectrum disorder, 20% had co-morbid post-traumatic stress disorder (PTSD), and about 20% had a co-morbid substance use disorder. The total number of diagnoses averaged approximately three. Diagnoses were assigned using a computerized version of the Diagnostic Interview Schedule (Blouin et al., 1988). Average age was 22.19 (SD = 2.77). Sixty percent was Non-Hispanic White; 25.3% was African-American; 10.5% was Hispanic; 1.5% was Native American; 1.2% was Asian-American or Pacific Islander; ethnicity was not classified for the remaining 1%. Forty-four percent was single; 37% was married; 10% was separated; 7% was divorced; 1% was widowed. Further details regarding the military experience of the sample (e.g., length of service, active duty status) are unavailable. Given the alarming increase in death by suicide in the military with close to 300 suicide deaths in active-duty military in 2009 alone (Luxton et al., 2009), the relevance and importance of the topic of the current study are difficult to overstate.

Of the 311 participants evaluated upon entry to the study, 239 were re-evaluated one month later. There were no differences on study variables between those who did and did not return except that those who did not return had slightly more suicidal ideation at baseline than those who did return (correlation between return/not and suicidal ideation was .12, $p < .05$).

5.2. Procedures

All participants provided full, informed, and written consent for research participation and were thoroughly clinically evaluated at pre-treatment (i.e., "baseline" assessment). All patients were offered rigorous treatment and were randomly-assigned to a problem-solving treatment or treatment-as-usual (as described by Rudd et al., 2000). A follow-up assessment was conducted post-treatment, one month after baseline. Interviews and administration of measures were conducted by clinical staff. Refer to Rudd et al., 1996 for more detailed information on procedures.

5.3. Measures

5.3.1. Insomnia symptoms

Assessed at both baseline and follow-up, the insomnia symptom index consisted of three items: Beck Depression Inventory (BDI; Beck et al., 1961) Items 16 (sleeplessness) and 17 (fatigue), as well as Suicide Probability Scale (SPS; Cull

and Gill, 1982) Item 33 (fatigue and listlessness). The BDI and SPS items are rated on a 0-to-3 rating scale. Scores on the insomnia symptom index could range from 0 to 9, with higher scores indicating greater symptom severity. Of note, BDI items 16 and 17 have been used in past literature as an index of sleep symptom severity (e.g., Perlis et al., 1997). Moreover, the use of a brief index has precedence in the literature on suicide risk. For example, the four-item Suicide Behaviors Questionnaire-Revised (SBQ-R; Osman et al., 2001) is psychometrically sound. The same can be said of the four-item Depressive Symptom Index-Suicidality Subscale (Metalsky and Joiner, 1997) and of the four-item P4 screener (Dube et al., 2010).

At baseline, the coefficient alpha of these three items was adequate at .71 and at follow-up was .76. As would be expected for a phenomenon that has episodic and state-like qualities (Buysse et al., 2010; Perlis et al., 1997; Vallières et al., 2005), the test–retest coefficient for the insomnia symptom index was in the moderate range ($r = .44$, $p < .01$). Test–retest coefficients in the moderate range are the norm for validated indices of insomnia, when the test–retest interval is three weeks or longer (as in the present study). For instance, in a sample of 50 undergraduates selected into a separate study for the presence of suicidal ideation, test–retest of the Insomnia Severity Index (Morin, 1993) over the course of three weeks was .41, $p < .05$ (Bernert and Joiner, in preparation).

Regarding validity, in approximately 200 undergraduates who completed the BDI and the Insomnia Severity Index for a separate study (Ribeiro et al., in press), the correlation between the composite of BDI Items 16 and 17 and ISI scores was .60, $p < .01$ (the SPS was not available in this particular sample)—substantial considering that the reliability ceiling of the three-item index is in the range of .71–.76, and the ceiling for the composite of the two BDI items is lower. Similarly, in the undergraduate sample alluded to above, the average correlation across the three week study between the composite of the two BDI items and the Insomnia Severity Index was .61, $p < .05$.

The insomnia symptom index at baseline served as the main independent variable of interest in the prediction of suicidal ideation cross-sectionally and of both suicidal ideation and suicide attempt longitudinally. Also, analyses were conducted in which the insomnia symptom index at follow-up served as the dependent variable and suicidal ideation served as a predictor, which allowed for examination of directionality of effects.

5.3.2. Modified Scale for Suicidal Ideation (MSSI; Miller, Norman, Bishop, & Dow, 1986)

The MSSI is an 18-item scale that is a designed to assess several aspects of suicidality. Each MSSI item was rated on a 0 to 3 scale; a total score of 11 or greater indicates clinical significance. Miller et al. (1986) have reported reliability coefficients and construct validity data for this measure (see also Clum and Yang, 1995).

5.3.3. Psychosocial history

This interviewer-rated form assessed demographic information and relevant personal history. The form administered at follow-up included a question on whether a suicide attempt had occurred since baseline. Of the 239 participants who returned for follow-up, ten reported suicide attempts between baseline and follow-up. We thus created a dichotomous variable (i.e. reflecting whether or not a suicide attempt occurred between baseline and follow-up), which served as a dependent variable in our longitudinal analysis predicting follow-up attempt status using the baseline insomnia symptom index, controlling for baseline suicidal ideation, depression, and hopelessness.

5.3.4. Millon Clinical Multiaxial Inventory (MCMI; Millon and Davis, 1997)

The original MCMI is a 175-item, true-false inventory. For the present purposes, the major depression, anxiety, alcohol abuse, and drug abuse subscales were used as covariates. The scales' reliability and validity appear to be adequate (Millon and Davis, 1997). The congruence of various versions of the MCMI scales has also been adequate (Marlowe et al., 1998). We use the depression subscale as measure of depression instead of the BDI to avoid contamination between predictor and dependent variables.

5.3.5. Beck Hopelessness Scale (BHS; Beck et al., 1974)

The BHS includes 20 true-false items that assess hopeless cognitions. The scale's reliability and validity have been supported (Metalsky et al., 1993). The BHS was used as a covariate; given that the BHS and the BDI share content and were developed by the same investigator, its use as a covariate in analyses involving our insomnia symptom index, also based in part on the BDI, may be considered a reasonably stringent data-analytic approach.

5.4. Data-analytic strategy

For cross-sectional analyses, we used multiple regression analyses, predicting MSSI suicidal ideation. The insomnia symptom index, BHS hopelessness scores, and MCMI depression scores were entered simultaneously as predictors. Recognizing viable covariates beyond depression and hopelessness, we also entered PTSD diagnosis, baseline MCMI anxiety scores, substance abuse, and alcohol abuse scores as control variables.

Regarding longitudinal analyses, a similar approach was used to evaluate whether the insomnia symptom index at baseline predicted MSSI suicidal ideation at follow-up, controlling for baseline MSSI, BHS, PTSD, and MCMI scores. To evaluate directionality, we conducted a similar analysis in which the insomnia symptom index and MSSI "switched places:" The dependent variable was the insomnia symptom index at follow-up, and predictors included baseline insomnia symptom index, MSSI, BHS, PTSD, and MCMI scores. Additional analyses involved a logistic regression examining the relation of baseline insomnia symptom index to a variable reflecting whether or not participants reported a suicide attempt occurring between baseline and follow-up. Baseline MSSI, BHS, MCMI anxiety, MCMI substance abuse, and MCMI alcohol abuse scores as well as PTSD diagnosis were controlled in these analyses.

6. Results

Means, standard deviations, and intercorrelations for all variables are presented in Table 2. Notably, symptom scores

Table 2
Means, standard deviations, and intercorrelations between all measures for study (N = 311 at Time 1, N = 239 at Time 2).

	1	2	3	4	5	6	7	8	9	10	11
1. Sleep—initial	–										
2. MSSI total—initial	.394**	–									
3. BHS total—initial	.553**	.488**	–								
4. MCMI major depression—initial	.338**	.297**	.375**	–							
5. MCMI anxiety—initial	.258**	.299**	.379**	.708**	–						
6. MCMI alcohol abuse—initial	.106	.154**	.060	.408**	.477**	–					
7. MCMI substance abuse—initial	.036	.027	−.226**	−.011	−.001	.544**	–				
8. PTSD	.231**	.200**	.131*	.131*	.204**	.184**	.096	–			
9. Sleep—1 month	.435**	.143*	.205**	.157*	.258**	.106	.036	.231**	–		
10. MSSI total—1 month	.274**	.315**	.225**	.142*	.119	.057	−.011	.148**	.303**	–	
11. Addtl suicide attempt—1 month	.135*	−.002	−.017	.022	.236	−.089	.001	.176**	.079	.264**	–
Mean	4.42	23.30	8.73	66.53	87.77	59.66	62.55	.23	2.83	5.98	.04
SD	2.67	10.42	6.36	13.43	20.35	17.63	19.34	.42	2.30	9.77	.20

** Correlation is significant at the .01 level (2-tailed).
* Correlation is significant at the .05 level (2-tailed).

are elevated at baseline. For the insomnia symptom index, the mean score was 4.42 ($SD = 2.67$). Mean MSSI scores were also elevated ($M = 23.30$, $SD = 10.42$), as expected. Participants reported an average score of 8.73 ($SD = 6.36$) on the BHS, 66.53 ($SD = 13.43$) on the MCMI depression subscale, 87.77 (SD = 20.35) on the MCMI anxiety subscale at baseline, 59.66 (SD = 17.63) on the MCMI alcohol abuse subscale, and 62.55 (SD = 19.34) on the MCMI drug abuse subscale (scores above 65 are in the clinical range). Further, all symptom scores were significantly intercorrelated at baseline, and with the insomnia symptom index (M = 2.83, SD = 2.30) and MSSI ($M = 5.98$, $SD = 9.77$) at one-month follow-up, as anticipated. Additional suicide attempts at one month follow-up were positively correlated with sleep score at baseline ($r = .14$, $p < .05$), with MSSI total score at follow-up ($r = .26$, $p < .01$), as well as with PTSD diagnosis (r = .18, p < .01).

6.1. Cross-sectional analyses: does the insomnia symptom index predict MSSI suicidal ideation controlling for hopelessness, depression, PTSD, anxiety, and drug and alcohol abuse?

The answer to this question is yes. For this analysis, the insomnia symptom index, BHS, MCMI depression, anxiety, alcohol abuse and drug abuse scores, and PTSD diagnosis were entered simultaneously as predictors into a multiple regression equation, predicting MSSI. The insomnia symptom index emerged as a significant predictor of suicidal ideation, beyond the effects of hopelessness, depression, PTSD, anxiety, alcohol and drug abuse ($pr = .12$, $t\ [307] = 2.11$, $p < .05$). Hopelessness ($pr = .34$, $t\ [307] = 6.35$, $p < .001$) also emerged as a significant predictor of suicidal ideation, beyond the effects of the other rival covariates.

6.2. Longitudinal analyses: 1) Does the insomnia symptom index at baseline predict MSSI suicidal ideation at follow-up, controlling for baseline MSSI, and for hopelessness depression, PTSD, anxiety, and drug and alcohol abuse?

Here, too, the answer to this question is yes. A similar multiple regression approach as outlined above was used to evaluate whether the insomnia symptom index at baseline predicted MSSI scores at follow-up, controlling for baseline MSSI, BHS, PTSD, and MCMI depression, anxiety, drug abuse, and alcohol abuse scores. As would be expected, MSSI scores at baseline predicted MSSI scores at one-month follow-up ($pr = .19$, $t\ [234] = 2.97$, $p < .01$). Of the remaining predictors, only the insomnia symptom index evinced a significant longitudinal relationship to increased suicidal ideation at follow-up ($pr = .14$, $t\ [234] = 2.13$, $p < .05$). Hopelessness ($pr = .01$, $t\ [234] = 0.21$, $p =$ ns), depression ($pr = .03$, $t\ [234] = .39$, $p =$ ns), PTSD ($pr = .09$, $t\ [234] = .1.31$, $p =$ ns), anxiety ($pr = .12$, $t\ [234] = -.69$, $p =$ ns), drug abuse ($pr = -.01$, $t\ [234] = -.07$, $p =$ ns), and alcohol abuse ($pr = -.03\ 3$, $t\ [234] = -.38$, $p =$ ns) failed to do so.

6.3. Longitudinal analyses: 2) The question of directionality: Does MSSI suicidal ideation at baseline predict the insomnia symptom index at follow-up, controlling for baseline insomnia symptoms, and for hopelessness, depression, PTSD, anxiety, and drug and alcohol abuse?

No. To evaluate directionality, analyses were conducted in which the dependent variable was the insomnia symptom index at follow-up, and predictors included the insomnia symptom index at baseline, and baseline MSSI, BHS, PTSD diagnosis, MCMI depression, anxiety, drug abuse, and alcohol abuse scores.

Baseline suicidal ideation did not predict insomnia symptom scores at follow-up, controlling for baseline insomnia symptom scores ($pr = -.07$, $t\ [234] = -1.09$, $p =$ ns). This suggests that the longitudinal association between insomnia symptoms and suicidal ideation flows from insomnia symptoms to suicidal ideation.

6.4. Longitudinal analyses: 3) does the insomnia symptom index at baseline predict suicide attempts occurring between baseline and follow-up, controlling for baseline MSSI, and for hopelessness, depression, PTSD, anxiety, and drug and alcohol abuse?

Not quite. In a logistic regression equation controlling for baseline MSSI, BHS, PTSD MCMI depression, anxiety, drug and alcohol abuse scores, baseline insomnia symptom index scores were used as a predictor of suicide attempt status at follow-up. The insomnia symptom index emerged as a non-significant trend predicting a suicide attempt at follow-up (exponentiated beta [Exp(B)], which is an index of effect

size, was 1.33; Wald coefficient = 2.68, $p = .10$). Only PTSD (Exp(B) = 6.71; Wald coefficient = 5.83, $p < .05$) and MCMI alcohol abuse (Exp(B) = .92; Wald coefficient = 6.22, $p < .05$) emerged as significant predictors of subsequent suicide attempt. Although the effect of insomnia was not significant in this analysis, it is important to highlight that this was within the context of controlling for very robust predictors of suicidal behavior and, even then, the effect approached significance.

Of note, in a separate logistic regression when baseline insomnia symptom index scores were entered as a predictor of later suicide attempt, controlling for MCMI depression and BHS hopelessness scores, insomnia symptom index showed a significant longitudinal relationship to suicide attempt at follow-up (exponentiated beta [Exp(B)] = 1.45; Wald coefficient = 6.28, $p < .01$). Neither baseline suicidal ideation (Exp[B] = 0.98; Wald coefficient = 0.19, p = ns), hopelessness (Exp[B] = 0.91; Wald coefficient = 1.64, p = ns), nor depression (Exp[B] = 1.00; Wald coefficient = 0.01, p = ns) performed similarly.

7. Discussion

The current study's findings converge with a growing body of research, indicating a relationship between sleep disturbance and suicidality (Goldstein et al., 2008; Goodwin and Marusic, 2008; Keshavan et al., 1994; Liu, 2004; Sabo et al., 1991; Sjöström et al., 2007). This link has been reported in both clinical (Ağargün and Cartwright, 2003; Bernert et al., 2005; Sabo et al., 1991) and nonclinical population-based samples (Fujino et al., 2005; Goodwin and Marusic, 2008; Turvey et al., 2002) regarding suicidal ideation, suicide attempt, and death by suicide.

This investigation builds upon past findings by evaluating sleep problems as cross-sectional and longitudinal predictors of interviewer-assessed suicidal ideation and attempts, in direct comparison with depression, hopelessness, PTSD diagnosis, anxiety, drug and alcohol abuse, in a military sample. The present study revealed that insomnia symptoms served as a unique predictor of suicidal ideation assessed cross-sectionally, and for suicidal ideation and suicide attempt longitudinally (though the latter only held when controlling for only depression, hopelessness and baseline suicidal ideation, which are still strong predictors of death by suicide). This is a stringent test, given that depression is among the strongest predictors of suicide risk, and considering that insomnia and suicidality are symptoms of depression and highly associated with PTSD. An additional strength of this study was use of interviewer-assessed suicidal ideation and behavior. With a few exceptions (Bernert et al., 2005, 2009), the majority of past reports used single-item measures of suicidal ideation (Ağargün et al., 1997a, 1997b; Fawcett et al., 1990; Roberts et al., 2001).

This is also the first examination to our knowledge of such relationships in a military sample. There is some evidence that military status is associated with increased risk for suicide across cultures (Kim et al., 2006), and rates of suicide in the U.S. military have surged to record numbers in recent years (Kuehn, 2009; Lorge, 2011; US Army, 2011). The prevalence of sleep complaints appears significantly increased among military personnel when compared to civilians (Hoge et al., 2004; Neylan et al., 1998; Seelig et al., 2010), which does not appear to be explained by a PTSD diagnosis (Lewis et al., 2009).

The current study included limitations, which should be considered in interpreting the findings. The approach to the assessment of insomnia can be improved upon. One particular concern may be the construct validity of the insomnia symptom index as a measure of insomnia, as only one item indexes insomnia directly and the other two are assessments of fatigue. Although fatigue is highly associated with insomnia, it is also related to many other constructs as well (e.g., depression, physical illness, and eating disorders). Given the strong evidence base on sleep problems and suicidality, it would be reasonable to hypothesize that sleep problems are likely accounting for the effects. It is also important to note that analyses controlled for another strong potential confounding variable that is associated with fatigue, insomnia, and suicidality—namely, depressive symptoms. Therefore, future research using comprehensive self-report and objective measures of sleep problems is needed. In addition, findings involved relatively small effect sizes and did not examine potential variables (e.g., rumination, physiological effects of sleeplessness) that might mediate the results. Nevertheless, it should be emphasized that results conformed to stringent, a priori hypotheses, persisted after controlling for relevant variables, emerged within a multi-method assessment strategy, and were similar to – and in some cases exceeded – effects for variables with traditionally strong effects. It should also be acknowledged that the current findings may not be generalizable outside of a severe risk sample. However, studying a severe sample will likely serve to highlight the highly salient risk factors.

Importantly, the results do not diminish the importance of depression and hopelessness as indicators of increased suicide risk as much as they underscore the importance of sleep problems. Based on the present findings, incorporating sleep problems into suicide risk assessment may be clinically important and potentially enhance detection of at-risk military members as sleep disturbances are often easily detectable (Goldstein et al., 2008), in contrast to many other suicide risk factors (e.g., past suicide attempt history). Information regarding more traditional suicide risk factors provides a context for determining how much weight to place on sleep problems, which likely informs on-going risk assessment and treatment (Gutierrez et al., 2009).

Overarousal may be an overarching factor underlying the association between insomnia and suicidality, as absence of sleep may be an indicator of agitation. Though limited, there is an emerging body of literature that suggests agitation or overarousal is an acute risk factor for suicide (Busch and Fawcett, 2004; Busch et al., 2003; Kovasznay et al., 2004). In addition to literature directly examining the role of agitation per se, research on agitated-related constructs also provides some support for this hypothesis. Anxiety disorders, for instance, appear to confer additional risk to suicidal ideation and behavior in individuals with bipolar disorder as compared to both depressed patients and individuals who do not have a mood disorder (Dilsaver et al., 2006). Further research is needed to clarify how insomnia is related to suicidality and whether overarousal is the higher-order factor accounting for the relationship between sleep disturbance and suicide.

Impaired emotional processing is another possible explanatory pathway. Sleep restriction is associated with mood decrements and emotional volatility (Dinges et al., 1997; Leotta et al., 1997; Zohar et al., 2005). Dysregulated sleep has been found to predict mood lability and elevated suicidality (Bernert and Joiner, 2010)—and mood lability predicts suicidality when controlling for depression severity (Bronisch, 1992; Zlotnick et al., 1997). Future research should focus on examining whether overarousal, mood dysregulation, or their interaction may explain the relationship between disturbed sleep and suicidality.

In combination with the past literature on sleep disturbance and suicide, the present findings also suggest that evaluating the efficacy of sleep-focused interventions on suicidal symptoms may be promising. If found to be effective, sleep-focused interventions may be particularly important to consider in military populations, where stigma is well-documented and an obstacle to successful treatment implementation and mental health care utilization (Hoge et al., 2004). In stark contrast to mental health concerns, soldiers appear willing to seek help for sleep-related problems. Sleep problems are also common among active-duty military, especially while deployed (Peterson et al., 2008). The current findings converge with recent treatment trials showing that brief behavioral interventions for insomnia are associated with decreased depressive symptoms and suicidality post-treatment (Buysse et al., 2011; Manber et al., 2008, in submission; Morin et al., 2006, 2009; NIH Consensus Science Statements). The current findings combine with that of others to affirm the restorative power of sleep, and the potentially disastrous effects of its absence.

Role of funding source

The current project was supported, in part, by grants awarded to the Denver VA Medical Center and to Florida State University by the Department of Defense. The Department of Defense had no further role in the study design; in the collection, analysis, and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication. The views and opinions expressed do not represent those of the Department of Veterans Affairs, the Department of Defense, or the United States Government.

Conflict of interest

All authors denied any possible conflict of interest with other people or organizations within 3 years of beginning the submitted work that could inappropriately influence the present research study.

Acknowledgments

The authors have no acknowledgments.

References

Ağargün, M.Y., Cartwright, R., 2003. REM sleep, dream variables and suicidality in depressed patients. Psychiatry Research 119 (1–2), 33–39.

Ağargün, M.Y., Kara, H., Solmaz, M., 1997a. Sleep disturbances and suicidal behavior in patients with major depression. The Journal of Clinical Psychiatry 58 (6), 249–251.

Ağargün, M.Y., Kara, H., Solmaz, M., 1997b. Subjective sleep quality and suicidality in patients with major depression. Journal of Psychiatric Research 31 (3), 377–381.

Ağargün, M.Y., Çilli, A.S., Kara, H., Tarhan, N., Kincir, F., Öz, K., 1998. Repetitive and frightening dreams and suicidal behavior in patients with major depression. Comprehensive Psychiatry 39 (4), 198–202.

Ağargün, M.Y., Besiroglu, L., Cilli, A.S., Gulec, M., Aydin, A., Inci, R., Selvi, Y., 2007. Nightmares, suicide attempts, and melancholic features in patients with unipolar major depression. Journal of Affective Disorders 98 (3), 267–270.

Baglioni, C., Spiegelhalder, K., Lombardo, C., Riemann, D., 2010. Sleep and emotions: a focus on insomnia. Sleep Medicine Reviews 14 (4), 227–238.

Barraclough, B., Pallis, D.J., 1975. Depression followed by suicide: a comparison of depressed suicides with living depressives. Psychological Medicine 5, 55–61.

Beck, A.T., Ward, C.H., Mendelson, M., Mock, J., Erbaugh, J., 1961. An inventory for measuring depression. Archives of General Psychiatry 4, 561–571.

Beck, A.T., Weissman, A., Lester, D., Trexler, L., 1974. The measurement of pessimism: the hopelessness scale. Journal of Consulting and Clinical Psychology 42, 861–865.

Beck, A., Brown, G., Berchick, R., Stewart, B., Stewart, R., 1990. Relationship between hopelessness and ultimate suicide: a replication with psychiatric outpatients. American Journal of Psychiatriy 147, 190–195.

Bernert, R.A., Joiner, T.E., 2010. Objectively-assessed sleep variability uniquely predicts increased suicide risk in a prospective evaluation of young adults. Sleep: Abstract Supplement 33, 232–233.

Bernert, R., Joiner, T., in preparation. *The sleep behavior of undergraduates in the wild*.

Bernert, R.A., Joiner, T.E., Cukrowicz, K.C., Schmidt, N.B., Krakow, B., 2005. Suicidality and sleep disturbances. Sleep 28 (9), 1135–1141.

Bernert, R., Turvey, C., Conwell, Y., Joiner, T., 2007. Sleep disturbance as a unique risk factor for completed suicide. Sleep 30, A334.

Bernert, R., Timpano, K., Joiner, T., 2008. Insomnia and poor sleep quality as predictors of suicidal symptoms in a nonclinical sample. Paper Presented at the American Academy of Sleep Medicine. June 9.

Bernert, R.A., Reeve, J., Perlis, M.L., Joiner, T.E., 2009. Insomnia and nightmares as predictors of elevated suicide risk among patients seeking admission to emergency mental health facility. Sleep: Abstract Supplement 32, 198.

Blouin, A.G., Perez, E.L., Blouin, J.H., 1988. Computerized administration of the diagnostic interview schedule. Psychiatry Research 23, 335–344.

Britt, T.W., Greene-Shortridge, T., Brink, S., Nguyen, Q., Rath, J., Cox, A., Hoge, C., Castro, C., 2008. Perceived stigma and barriers to care for psychological stressors: implications for reactions to stressors in different contexts. Journal of Social and Clinical Psychology 27 (4), 317–335.

Bronisch, T., 1992. Does an attempted suicide have a cathartic effect? Acta Psychiatrica Scandinavica 86 (3), 228–232.

Busch, K.A., Fawcett, J., 2004. A fine grained study of inpatients who commit suicide. Psychiatric Annals 34 (5), 357–365.

Busch, K., Fawcett, J., Jacobs, D., 2003. Clinical correlates of inpatient suicide. The Journal of Clinical Psychiatry 64, 14–19.

Buysse, D.J., Cheng, Y., Germain, A., Moul, D.E., Franzen, P.L., Fletcher, M., Monk, T.H., 2010. Night-to-night sleep variability in older adults with and without chronic insomnia. Sleep Medicine 11 (1), 56–64.

Buysse, D.J., Germain, A., Moul, D.E., Franzen, P.L., Brar, L.K., Fletcher, M.E., Begley, A., Houck, P.R., Mazumdar, S., Reynolds III, C.F., Monk, T.H., 2011. Efficacy of brief behavioral treatment for chronic insomnia in older adults. Archives of Internal Medicine 171 (10), 887–895.

Chellappa, S.L., Araújo, J.F., 2007. Sleep disorders and suicidal ideation in patients with depressive disorder. Psychiatry Research 153 (2), 131–136.

Clum, G.A., Yang, B., 1995. Additional support for the reliability and validity of the modified scale for suicide ideation. Psychological Assessment 7 (1), 122–125.

Cull, J.G., Gill, W.S., 1982. Suicide Probability Scale. WPS, Los Angeles, CA.

Dilsaver, S., Akiskal, H., Aksiskal, K., Benazzi, F., 2006. Dose–response relationship between number of comorbid anxiety disorders in adolescent bipolar/unipolar disorders, and psychosis, suicidality, substance abuse and familiarity. Journal of Affective Disorders 96, 249–258.

Dinges, D.F., Pack, F., Williams, K., Gillen, K.A., Powell, J.W., Ott, G.E., Pack, A.I., 1997. Cumulative sleepiness, mood disturbance, and psychomotor vigilance performance decrements during a week of sleep restricted to 4–5 hours per night. Sleep Journal of Sleep and Sleep Disorders Research 20 (4), 267–277.

Dube, P., Kroenke, K., Bair, M., Theobald, D., Williams, L., 2010. The P4 screener: evaluation of a brief measure for assessing potential suicide risk in 2 randomized effectiveness trials of primary care and oncology patients. Primary Care Companion to The Journal of Clinical Psychiatry 12 (6), e1–e8.

Fawcett, J., Scheftner, W.A., Fogg, L., Clark, D.C., Young, M.A., Hedeker, D., Gibbons, R., 1990. Time-related predictors of suicide in major affective disorder. The American Journal of Psychiatry 147 (9), 1189–1194.

Fujino, Y., Mizoue, T., Tokui, N., Yoshimura, T., 2005. Prospective cohort study of stress, life satisfaction, self-rated health, insomnia, and suicide death in Japan. Suicide & Life-Threatening Behavior 35 (2), 227–237.

Goldstein, T.R., Bridge, J.A., Brent, D.A., 2008. Sleep disturbance preceding completed suicide in adolescents. Journal of Consulting and Clinical Psychology 76 (1), 84–91.

Goodwin, R.D., Marusic, A., 2008. Association between short sleep and suicidal ideation and suicide attempt among adults in the general population. Sleep: Journal of Sleep and Sleep Disorders Research 31 (8), 1097–1101.

Green-Shortridge, T., Britt, T., Andrew, C., 2007. The stigma of mental health problems in the military. Military Medicine 172 (2), 157–161.

Gutierrez, P.M., Brenner, L.A., Olson-Madden, J.H., Breshears, R., Homaifar, B.Y., Betthauser, L.M., Adler, L.E., 2009. Consultation as a means of veteran suicide prevention. Professional Psychology: Research and Practice 40 (6), 586–592.

Hall, R., Platt, D., Hall, R., 1999. Suicide risk assessment: a review of risk factors for suicide in 100 patients who made severe suicide attempts: evaluation of suicide risk in a time of managed care. Psychosomatics: Journal of Consultation Liaison Psychiatry 40 (1), 18–27.
Hoge, C.W., Castro, C.A., Messer, S.C., McGurk, D., Cotting, D.I., Koffman, R.L., 2004. Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. The New England Journal of Medicine 351, 13–22.
Joiner, T.E., 2005. Why People Die by Suicide. Harvard University Press, Cambridge, MA.
Keshavan, M.S., Reynolds, C.F., Montrose, D.D., Miewald, J.J., Downs, C., Sabo, E.M., 1994. Sleep and suicidality in psychotic patients. Acta Psychiatrica Scandinavica 89 (2), 122–125.
Killgore, W., Balkin, T., Wesensten, N., 2006. Impaired decision making following 49 h of sleep deprivation. Journal of Sleep Research 15 (1), 7–13.
Kim, M., Hong, S., Lee, S., Kwak, Y., Lee, C., Hwang, S., Shin, J., 2006. Suicide risk in relation to social class: a national register-based study of adult suicides in Korea, 1999–2001. The International Journal of Social Psychiatry 52 (2), 138–151.
Kovasznay, B., Miraglia, R., Beer, R., Way, B., 2004. Reducing suicides in New York State correctional facilities. The Psychiatric Quarterly 75, 61–70.
Kraepelin, E., 1921. Manic-Depressive Insanity and Paranoia. Livingstone, Edinburgh.
Krakow, B., Ribeiro, J., Ulibarri, V., Krakow, J., Joiner, T.E., 2011. Sleep disturbances and suicidal ideation in sleep medical center patients. Journal of affective disorders 131 (1–3), 422–427.
Kuehn, B.M., 2009. Soldier suicide rates continue to rise: military, scientists work to stem the tide. JAMA : The Journal of the American Medical Association 301 (11), 1111–1113.
Leotta, C.R., Carskadon, M.A., Acebo, C., Seifer, R., Quinn, B., 1997. Effects of acute sleep restriction on affective response in adolescents: preliminary results. Sleep Research 26, 201.
Lewis, V., Creamer, M., Failla, S., 2009. Is poor sleep in veterans a function of post-traumatic stress disorder? Military Medicine 174 (9), 948–951.
Liu, X., 2004. Sleep and adolescent suicidal behavior. Sleep: Journal of Sleep and Sleep Disorders Research 27 (7), 1351–1358.
Lorge, E.M. Army Responds to Rising Suicide Rates. Army News Service 2008. Available at: http://www.behavioralhealth.army.mil/news/20080131armyrespondstosuicide.html. Accessed April 08, 2011.
Luxton, D., Skopp, N., Kinn, J., Bush, N., Reger, M., Gahm, G., 2009. Department of Defense Suicide Event Report. Retrieved from: http://www.suicideoutreach.org/sites/default/files/2009_DoDSER_Annual_Report.pdf.
Manber, R., Edinger, J.D., Gress, J.L., San Pedro-Salcedo, M.G., Kuo, T.F., Kalista, T., 2008. Cognitive behavioral therapy for insomnia enhances depression outcome in patients with comorbid major depressive disorder and insomnia. Sleep: Journal of Sleep and Sleep Disorders Research 31 (4), 489–495.
Manber, R., Seibern, A., Bernert, R., in submission. Adherence and non-sleep outcomes in an open trial of CBT for insomnia among patients with high and low depression scores. Journal of Clinical Sleep Medicine.
Marlowe, D.B., Festinger, D.S., Kirby, K.C., Rubenstein, D.F., Platt, J.J., 1998. Congruence of the MCMI-II and MCMI-III in cocaine dependence. Journal of Personality Assessment 71, 15–28.
McCall, W.V., Blocker, J.N., D'Agostino, R., Kimball, J., Boggs, N., Lasater, B., Rosenquist, P.B., 2010. Insomnia severity is an indicator of suicidal ideation during a depression clinical trial. Sleep Medicine 11 (9), 822–827.
McGirr, A., Renaud, J., Seguin, M., et al., 2007. An examination of DSM-IV depressive symptoms and risk for suicide completion in major depressive disorder: a psychological autopsy study. Journal of Affective Disorders 97 (1–3), 203–209.
Metalsky, G.I., Joiner, T.E., 1997. The hopelessness depression symptom questionnaire. Cognitive Therapy and Research 21, 359–384.
Metalsky, G.I., Joiner, T.E., Hardin, T.S., Abramson, L.Y., 1993. Depressive reactions to failure in a naturalistic setting: a test of the hopelessness and self-esteem theories of depression. Journal of Abnormal Psychology 102, 101–109.
Miller, I.W., Norman, W.H., Bishop, S.B., Dow, M.G., 1986. The modified scale for suicidal ideation: reliability and validity. Journal of Consulting and Clinical Psychology 54 (5), 724–725.
Millon, T., Davis, R.D., 1997. The MCMI-III: Present and future directions. Journal of Personality Assessment 68, 69–88.
Morin, C.M., 1993. Insomnia: Psychological Assessment and Management. Guilford Press, New York.
Morin, C.M., Bootzin, R.R., Buysse, D.J., Edinger, J.D., Espie, C.A., Lichstein, K.L., 2006. Psychological and behavioral treatment of insomnia: update of the recent evidence (1998–2004). Sleep: Journal of Sleep and Sleep Disorders Research 29 (11), 1398–1414.
Morin, C.M., Vallières, A., Guay, B., Ivers, H., Savard, J., Mérette, C., Baillargeon, L., 2009. Cognitive behavioral therapy, singly and combined with medication, for persistent insomnia: a randomized controlled trial. JAMA : The Journal of the American Medical Association 301 (19), 2005–2015.
Neylan, T.C., Marmar, C.R., Metxler, T.J., Weiss, D.S., Zatzick, D.F., Delucchi, K.L., Schoenfeld, F.B., 1998. Sleep disturbances in the Vietnam generation: findings from a nationally representative sample of male Vietnam veterans. The American Journal of Psychiatry 155, 929–933.
NIH Consensus Science Statements, 2005. NIH State-of-the-Science conference statement on manifestations and management of chronic insomnia in adults. Journal of Clinical Sleep Medicine 1 (4), 412–421.
Nock, M., Hwang, I., Sampson, N., Kessler, R., 2010. Mental disorders, comorbidity, and suicidal behavior: results from the national comorbidity survey replication. Molecular Psychiatry 15, 868–876.
Oquendo, M.A., Kamali, M., Ellis, S.P., Grunebaum, M.F., Malone, K.M., Brodsky, B.S., Sackheim, H.A., Mann, J.J., 2002. Adequacy of antidepressant treatment after discharge and the occurrence of suicidal acts in major depression: a prospective study. The American Journal of Psychiatry 159, 1746–1751.
Oquendo, M.A., Galfalvy, H., Russo, S., Ellis, S.P., Grunebaum, M.F., Burke, A., Mann, J.J., 2004. Prospective study of clinical predictors of suicidal acts after a major depressive episode in patients with major depressive disorder or bipolar disorder. The American Journal of Psychiatry 161, 1433–1441.
Osman, A., Bagge, C.L., Gutierrez, P.M., Konick, L.C., Kopper, B.A., Barrios, F.X., 2001. The Suicidal Behaviors Questionnaire—Revised (SBQ-R): validation with clinical and non-clinical samples. Assessment 8, 445–455.
Perlis, M.L., Giles, D.E., Buysse, D.J., Tu, X., Kupfer, D.J., 1997. Self-reported sleep disturbance as a prodromal symptom in recurrent depression. Journal of Affective Disorders 42 (2–3), 209–212.
Peterson, A.L., Goodie, J.L., Satterfield, W.A., Brim, W.L., 2008. Sleep disturbance during military deployment. Military Medicine 173 (3), 230–235.
Ribeiro, J., Bender, T., Selby, E., Hames, J., Joiner, T., in press. *Development and validation of a brief self-report measure of agitation: The Brief Agitation*. Journal of Personality Assessment.
Roberts, R.E., Roberts, C.R., Chen, I.G., 2001. Functioning of adolescents with symptoms of disturbed sleep. Journal of Youth and Adolescence 30 (1), 1–18.
Rudd, M.D., Joiner, T.E., Rajab, M.H., 1996. Relationships among suicide ideators, attemptors, and multiple attemptors in a young-adult sample. Journal of Abnormal Psychology 105, 541–550.
Rudd, M.D., Joiner, T.E., Rajab, M.H., 2000. Treating Suicidal Behavior. Guilford, New York.
Sabo, E., Reynolds, C.F., Kupfer, D.J., Berman, S.R., 1991. Sleep, depression, and suicide. Psychiatry Research 36 (3), 265–277.
Schmidt, R.E., Gay, P., Ghisletta, P., Van der Linden, M., 2010. Linking impulsivity to dysfunctional thought control and insomnia: a structural equation model. Journal of Sleep Research 19, 3–11.
Seelig, A.D., Jacobsen, I.G., Smith, B., et al., 2010. Sleep patterns before, during, and after deployment to Iraq and Afghanistan. Sleep 33 (12), 1615–1621.
Sjöström, N., Waern, M., Hetta, J., 2007. Nightmares and sleep disturbances in relation to suicidality in suicide attempters. Sleep 30, 91–95.
Smith, M.T., Perlis, M.L., Haythornthwaite, J.A., 2004. Suicidal ideation in outpatients with chronic musculoskeletal pain: an exploratory study of the role of sleep onset insomnia and pain intensity. The Clinical Journal of Pain 20 (2), 111–118.
Tanskanen, A., Tuomilehto, J., Viinamäki, H., Vartiainen, E., Lehtonen, J., Puska, P., 2001. Nightmares as predictors of suicide. Sleep: Journal of Sleep and Sleep Disorders Research 24 (7), 844–847.
Turvey, C.L., Conwell, Y., Jones, M.P., Phillips, C., Simonsick, E., Pearson, J.L., Wallace, R., 2002. Risk factors for late-life suicide: a prospective community-based study. The American Journal of Geriatric Psychiatry – Special Issue: Suicidal Behaviors in Older Adults 10 (4), 398–406.
US Army, 2011. Army Health Promotion Risk Reduction Suicide Prevention Report 2010. Available at: http://www.army.mil/-news/2010/07/28/42934-army-health-promotion-risk-reduction-and-suicide-prevention-report/index.html. Accessed March 30, 2011.
Vallières, A., Ivers, H., Bastien, C.H., Beaulieu-Bonneau, S., Morin, C.M., 2005. Variability and predictability in sleep patterns of chronic insomniacs. Journal of Sleep Research 14 (4), 447–453.
Wojnar, M., Ilgen, M.A., Wojnar, J., McCammon, R.J., Valenstein, M., Brower, K.J., 2009. Sleep problems and suicidality in the national comorbidity survey replication. Journal of Psychiatric Research 43 (5), 526–531.
Zlotnick, C., Donaldson, D., Spirito, A., Pearlstein, T., 1997. Affect regulation and suicide attempts in adolescent inpatients. Journal of the American Academy of Child and Adolescent Psychiatry 36 (6), 793–798.
Zohar, D., Tzischinsky, O., Epstein, R., Lavie, P., 2005. The effects of sleep loss on medical residents' emotional reactions to work events: a cognitive-energy model. Sleep: Journal of Sleep and Sleep Disorders Research 28 (1), 47–54.

Suicide and Life-Threatening BEHAVIOR
THE OFFICIAL JOURNAL OF THE AMERICAN ASSOCIATION OF SUICIDOLOGY

DOI: 10.1111/sltb.12161

Risk Factors, Warning Signs, and Drivers of Suicide: What Are They, How Do They Differ, and Why Does It Matter?

Raymond P. Tucker, MS, Kevin J. Crowley, MA, Collin L. Davidson, PhD, and Peter M. Gutierrez, PhD

Research investigating suicide attempts and deaths by suicide has yielded many specific risk factors and warning signs for future suicidal behaviors. Yet, even though these variables are each valuable for suicide prevention efforts, they may be limited in their applicability to clinical practice. The differences among risk factors, warning signs, and "drivers," which are person-specific variables that lead individuals to desire death by suicide, are highlighted. The scarce evidence on drivers is described and specific recommendations for conducting future drivers-focused research and targeting them in clinical practice are suggested.

In this article we review the similarities and differences among suicide risk factors, warning signs, and drivers of suicide in such a way as to be relevant for both researchers and practicing clinicians. To do so, we begin by defining and briefly reviewing each construct, specifically highlighting the sparse literature available for drivers. Then, we provide specific recommendations for future research in this area and for targeting drivers in practice. Finally, we summarize this review with an eye toward clinical applicability.

Raymond P. Tucker, Department of Psychology, Oklahoma State University, Stillwater, OK, USA; Kevin J. Crowley, Capital Institute for Cognitive Therapy, Washington, DC, USA; Collin L. Davidson, Hennepin County Medical Center, Minneapolis, MN, USA; Peter M. Gutierrez, VA VISN 19 MIRECC, Denver VA Medical Center, Denver, CO, and Department of Psychiatry, University of Colorado School of Medicine, Aurora, CO, USA.

Address correspondence to Raymond P. Tucker, Department of Psychology, 116 North Murray Hall, Oklahoma State University, Stillwater, OK 74078; E-mail: raymopt@okstate.edu

RISK FACTORS FOR SUICIDE

Empirical research has identified and confirmed hundreds of suicide-specific risk factors or characteristics that may increase the likelihood that individuals will desire, attempt, or die by suicide at some point in their lives (O'Connor & Nock, 2014). Practitioners have consistently been advised to assess these factors when working with suicidal patients, as they have been linked historically with both imminent ("acute") and long-term ("chronic") suicide risk levels (e.g., Hall, Platt, & Hall, 1999). However, recent evidence increasingly suggests that the clinical utility of risk factors may be more limited than previously thought. For example, although risk factors have been linked with the experience of suicidal ideation (e.g., Kessler, Borges, & Walters, 1999), they cannot differentiate people with suicidal ideation who have or have not attempted suicide (Klonsky & May, 2014). In addition, Rudd (2003, 2008) has observed that the extensive time frame and homogenous patient populations needed to investigate a single risk factor means that

the information yielded might not directly translate to clinical judgments about an individual patient's acute risk level. This conclusion reflects the lack of a direct correlation between the number of risk factors a patient endorses and his or her degree of risk, despite previous suggestion of such a relation (e.g., Mościcki, 1997; Murphy, Wetzel, Robins, & McEvoy, 1992). Because of these limitations, researchers have attempted to identify factors that are more directly related to acute risk; to date, these have included "warning signs" (Rudd, 2003, 2008; Rudd et al., 2006) and "drivers" (Jobes, Comtois, Brenner, & Gutierrez, 2011).

WARNING SIGNS FOR SUICIDE

Rudd (2008) proposed that warning signs might enable professionals and lay individuals to intervene when acute suicidal crises emerge, in a manner analogous to how warning signs for heart attacks (e.g., arm pain, chest pain, and shortness of breath) can be identified and used to inform medical treatment. To streamline the thousands of warning signs listed on public Internet sites (e.g., Mandrusiak et al., 2006), the American Association of Suicidology (AAS) convened a working group of expert suicidologists in 2003. This panel distilled available information into a list of 10 suicide-specific warning signs (e.g., purposelessness, hopelessness, withdrawal, anger/aggression; Rudd et al., 2006), which have been widely disseminated and hold considerable promise for public health and educational campaigns. Yet, despite the potential role that these warning signs can play in suicide prevention efforts, questions remain about their ideal use in clinical practice.

For example, while it has been proposed that warning signs are only meaningful if they are applied as a constellation of factors (Rudd, 2008), the individual warning signs might relate to suicidal crises in different ways (e.g., Britton, Ilgen, Rudd, & Conner, 2012; McSwain, Lester, & Gunn, 2012). Most notably, the only AAS warning sign shown to actually differentiate individuals who experienced suicidal ideation and did make a suicide attempt from individuals who experienced suicidal ideation but did not make an attempt in one study was anger/aggression (Gunn, Lester, & McSwain, 2011). Although this specific warning sign may thus be particularly important to consider during risk assessment, clinical decisions based on single characteristics are problematic. Specifically, Fowler (2012) has suggested that, because changes in warning signs such as anger and aggression can be (and often are) observed in patients who are not acutely suicidal, the risk of false positives is high and the possibility of iatrogenic consequences for patients (such as hospitalization) must be considered carefully. Given these limitations, Fowler (2012) proposed that practitioners should not simply rely on risk factors or warning signs independently when assessing safety. Instead, he suggests that risk factors and warning signs should be assessed together in a collaborative, patient-specific manner to maximize the provider's understanding of what is "driving" the individual patient's suicidality.

DRIVERS OF SUICIDE

Suicide drivers reflect an emerging, therapeutic focus that has been discussed primarily within the Collaborative Assessment and Management of Suicidality framework (CAMS; Jobes, 2006). In describing suicide drivers, Jobes et al. (2011) suggested a way to organize warning signs and risk factors that reflects Fowler's assessment recommendations (2012) and that contextualizes a patient's unique struggles and pain. Specifically, they proposed that direct drivers include the idiosyncratic internal experiences, behaviors, and external situations that a patient associates with his or her suicidal crisis (i.e., increased suicidal ideation or a past suicide attempt). Jobes et al. define *direct drivers* as "suicide-specific thoughts, feelings, and behaviors which lead to suicidality for the patient"

(p. 389). In this way, direct drivers could be thought of as patient-specific warning signs. Furthermore, Jobes et al. then noted that indirect drivers include any circumstances that can lead a patient to believe that his or her life is not worth living, such as negative life events, other psychosocial stressors, and symptoms of psychiatric illnesses. Specifically, they state that *indirect drivers* include "life circumstances which are further contributing to suicidality" such as, "homelessness, depression, substance abuse, posttraumatic stress disorder, isolation" (p. 389), but are not endorsed as what is driving a suicidal crisis in a client. Indirect drivers thus do not necessarily relate to a specific, acute suicidal crisis. However, because they provide a context for a patient's personal pain, they represent an essential part of his or her suicide narrative (e.g., Michel et al., 2002). To demonstrate the differences and similarities between direct and indirect drivers, take for an example, a patient admitted to a psychiatric inpatient unit after a suicide attempt who may discuss feelings of burdensomeness on others as the reason for his or her attempt. For this client, perceptions of burdensomeness reflect his or her direct driver for suicide. Indirect drivers of this client's suicide desire may include financial instability or mental health disorders that influence their ability to keep a job and hence contribute to feelings of burdensomeness.

These direct and indirect drivers can be applied quickly and effectively to clinical care for suicidal patients. However, because they emphasize the importance of a specific patient's unique narrative, they do not lend themselves to public health and educational campaigns in the same way as the AAS's list of warning signs. Similarly, the individualized nature of drivers makes them more challenging to investigate empirically than risk factors, which are by definition static and often unmodifiable (e.g., Rudd, 2008). Additionally, researchers targeting suicide attempters suffering from severe psychotic symptoms and serious cognitive impairment may be wary of conducting suicide driver research as study participants may struggle to understand or illustrate what personally led to their suicidal crises. By extension, clinicians may have concerns about attempting to elicit information about suicide drivers from such patients. However, while the assumption that some patients may not be able to accurately identify their suicide drivers is intuitive, this idea has not been empirically investigated. Similarly, we suggest that even though an individual may identify a suicide driver that is not actually driving his or her suicidality (maybe in part due to cognitive impairment or memory disturbances), what is most important is what the individual believes is driving his or her suicidal crisis. Even though this information may not truly reflect what is driving the suicidal behavior in the individual, it signifies a person-specific warning sign that should be integrated into the conceptualization of the person's suicide concerns. Of course, there may be instances in which the assessment of any suicide driver may not be possible (i.e., clients suffering from extreme catatonic symptoms or certain kinds of dysphasia); the assessment of suicide risk factors or warning signs may be difficult, if not impossible, in these situations as well. Finally, the identification and measurement of suicide drivers may be confounded by memory disturbances in cognitively healthy research participants/patients, as suicide attempts have been linked to poor autobiographical memory specificity (Leibetseder, Rohrer, Mackinger, & Fartacek, 2006). Indeed, the challenges inherent to conducting drivers-related research might account, at least in part, for the notable scarcity of studies in this area to date.

The authors of the current study observed this scarcity when conducting a literature review to find empirical studies that targeted modifiable drivers for adult patients (see Table 1 for a detailed overview of this review's process and outcomes). Not a single empirical study discussed drivers as defined earlier or linked a driver with suicide attempts or deaths for adults. As such, we conducted a second review with broader inclusion criteria, specifically electing to

also include articles that discussed modifiable risk factors. The term *risk factor* was included despite the conceptual differences between these variable classes in case some studies classified "drivers" as risk factors (because the term *driver* is relatively new).

To be included in the full-text review in the second literature search, articles needed to satisfy six inclusion criteria that are listed in Table 1. Inclusion criteria were selected to review articles that depict factors that potentially drive suicide attempts and deaths in adults. Thus, only studies focused on suicide attempts and death by suicide in adult clinical samples were reviewed. The authors also sought to review articles targeting suicide drivers that may reasonably be modified through evidence-based psychological interventions. This criterion was set as the CAMS therapeutic framework requires collaborative treatment planning in order to reduce suicide drivers and decrease future suicidal behavior in clients and encourages relying on evidence-based interventions whenever possible (Jobes et al., 2011). Finally, this literature search aimed to review articles that employed rigorous empirical methodology. Thus, only articles that presented original, quantitative data gathered through case–control/case series, experimental, or meta-analytic methodologies were included in the full-text review.

Over 300 articles related to modifiable risk factors were obtained in this second review, but not one discussed drivers as described in this study (see Table 1 for a

TABLE 1
Overview of Suicide Driver Literature Reviews

	Literature Search 1	Literature Search 2
Search sources	MEDLINE and PsycINFO	MEDLINE and PsycINFO
Search terms	Suicid* and drive*	suicid* and theory, suicid* and model, suicid* and cause*, suicid* and predict*, suicid* and drive* suicid* and risk factor*
Number of articles obtained	148	More than 3,000
Inclusion criteria for full-text review	1 Published in English in past 20 years (1992–2012) 2 Adult clinical sample 3 Suicide attempts or deaths by suicide as an outcome variable 4 Assessed a modifiable psychological driver of suicide 5 Original, quantitative data presented 6 Case–control/case series, experimental, or meta-analysis methodology	1 Published in English in past 20 years (1992–2012) 2 Adult clinical sample 3 Suicide attempts or deaths by suicide as an outcome variable 4 Assessed a modifiable psychological driver of suicide 5 Original, quantitative data presented 6 Case–control/case series, experimental, or meta-analysis methodology
Number of articles meeting inclusion criteria	0	More than 300
Number of articles identifying modifiable drivers of suicide	0	0

Note. The term *modifiable* was operationalized in our reviews as characteristics that could be altered through a course of psychotherapy.

more detailed overview of this review's process and outcomes). Some studies initially seemed to discuss drivers in that they targeted unique patient populations with potentially idiosyncratic concerns (e.g., Compton, Thompson, & Kaslow, 2005; Darke & Kaye, 2004; Roy, 2003). Yet, none explicitly gauged what *drove* suicide attempts or deaths in their samples. Similarly, more recent research investigated theoretically derived risk factors of suicide in relationship to suicide attempts, such as thwarted belongingness, perceived burdensomeness, and acquired capability (e.g., Anestis & Joiner, 2011). However, these studies also did not investigate these factors in a way that can determine if their presence drove suicidal crises in study participants (i.e., participants who attempted suicide were compelled to attempt suicide because of their perceptions of burdensomeness or feelings of extreme social disconnection). Thus, although the case-specific modifiable risk factors may serve as drivers for individual patients, further empirically-based conclusions cannot be drawn given the lack of relevant available literature. The current literature relies heavily on correlations between risk factors and suicide-specific outcomes. What is lacking are studies examining the causal links between theoretical constructions, specific outcomes targeting those factors, and resulting reductions in suicide-related behaviors.

RECOMMENDATIONS FOR FUTURE SUICIDE DRIVER RESEARCH

Future research endeavors targeting drivers as an explicit focus should be strongly considered for several reasons. First, studies along these lines might inform theories about suicidal behaviors in new ways, especially if such research were to emphasize descriptive, qualitative methodologies which focus on suicidal patients' individual experiences. Specifically, several factors have been theorized to relate to patients' suicidal desires and behaviors, including extreme psychological pain and stress (Shneidman, 1985), thwarted belongingness and perceived burdensomeness (Joiner, 2005), feelings of entrapment and defeat (O'Connor, 2011), and an attentional bias to suicide-related cues (Wenzel & Beck, 2008). Patients' perspectives on the factors that drive their own suicidal thoughts and behaviors may deepen our understanding of how theoretically derived factors manifest for them. Thus, a clinician's assessment of suicide drivers should include, and even start with, the probing of theoretically derived factors such as psychological pain, perceptions of burdensomeness, and feelings of entrapment and defeat, but a simple understanding that a client experiences these feelings may not provide enough information regarding what is driving the client's suicidal behavior. As one example, because factors like perceived burdensomeness have been empirically linked with suicidal crises (e.g., Joiner et al., 2002; Van Orden, Lynam, Hollar, & Joiner, 2006), questions have been included in many risk assessment measures to gauge whether or not a suicidal patient experiences the perception of feeling like a burden on significant others (e.g., Jobes, Jacoby, Cimbolic, & Hustead, 1997). Yet, knowing whether or not someone feels like a burden may not be as clinically useful as knowing *what* makes *this person* feel like a burden.

Take, for example, a client who attempted suicide and presents with perceptions of burdensomeness. Although an understanding that the client experiences these thoughts and feelings provides general insight into the client's suicide risk, a deeper understanding of the patient's suicidal crises can be established following the assessment of perceived burdensomeness as a potential driver of suicide. This assessment may yield important clinical information including who the individual feels as though he or she burdens (e.g., partner and children) and why the individual feels as though his or her existence burdens others (e.g., the client's struggle with psychopa-

thology such as major depressive disorder or posttraumatic stress disorder and how it influences the client's family). Thus, the assessment of suicide drivers, specifically theoretically derived factors that relate to suicidal behavior, helps implement important theoretical knowledge into clinical practice. We propose that theories linking specific risk factors to near-term suicide-related behavior need to be empirically tested. The results of such research should then inform clinical assessment practices by guiding the categories of factors where assessments should begin to ultimately identify person-specific drivers of suicide which become the focus of treatment.

Additionally, drivers-focused research might illustrate factors that increase a person's chance of transitioning from suicidal ideation to attempts in a way that neither risk factors nor warning signs have yet been able to do. Although the study of suicide drivers will likely not, by itself, yield a comprehensive explanation for what prompts suicide ideation to transition into suicidal behavior, the identification of person-specific warning signs through drivers research may help move the field closer to a theoretical understanding of this ideation to action transition. For example, although there are likely unique factors for individual patients that spur them to make a suicide attempt, it may be the case that some patterns in these factors emerge when many accounts of attempt drivers are summed and considered together. When attempting to understand these patterns, suicide driver research may benefit from studying important theory-driven variables in their relationship to the transition from ideation to action. As theoretical frameworks such as the interpersonal-psychological theory of suicidal behavior (Joiner, 2005) and the integrated-motivational volitional model of suicide (O'Connor, 2011) indicate specific variables (e.g., acquired capability, impulsivity, and access to means) that may explain the transition from suicide ideation to action, future drivers research may benefit by studying how participant-identified drivers interact with these theory-driven constructs to predict this important transition.

Our understanding of these possible patterns could be honed further by determining whether there are differences in drivers in different categories, such as the severity of patients' suicidal crises (intensified ideation or a suicide attempt) or other general characteristics (e.g., life circumstances, demographic variables, and psychiatric diagnoses). Although drivers hold conceptual promise for clinical practice, empirical studies are warranted to determine the utility of determining suicide risk in this way. Such research might include investigating patients' satisfaction with and general experience of the risk assessment process following a traditional risk assessment or one steeped in a more individualized, drivers-focused philosophy. In addition, it could be helpful to determine the outcomes of these risk assessment frameworks, particularly with respect to their accuracy for determining patients' acute risk levels. With this information, recommendations could be made for altering the risk assessment process and the treatment targets considered essential for suicide-focused psychosocial interventions.

Future suicide driver research would benefit from the use of both qualitative and quantitative approaches. The utilization of questionnaires with open field responses as well as interview questions described in cognitive therapy for suicide (Wenzel, Brown, & Beck, 2009) and previous qualitative studies regarding suicide (Kraft, Jobes, Lineberry, Conrad, & Kung, 2010) would help measure suicide drivers in a person-specific way. Such questions include the following: "Why suicide?" "Why do you want to kill yourself?" "What makes you feel like your life was not worth living?" "What went through your head just before your last suicide attempt?" In addition, quantitative measures of suicide drivers can be integrated into theory-driven research. Currently, the only assessment measure of suicide drivers is the Suicide Status Form (SSF), which is a crucial element of the CAMS therapeutic framework (Jobes

et al., 1997). This measure assesses five potential drivers based on theory-driven suicide research: (1) psychological pain (hurt, anguish, and misery), (2) stress (feeling pressured or overwhelmed), (3) agitation (emotional urgency), (4) hopelessness, and (5) self-hate. Clients rate their experience of these drivers on a 1 (*low*) to 5 (*high*) Likert-type scale, as well as rank order these drivers on the importance of each in relation to why they attempted suicide or want to die by suicide (1 being the most important and 5 being the least important). Although not an exhaustive list of suicide drivers, the SSF is a well-validated measure of suicide drivers that can be utilized in suicide driver research (Conrad et al., 2009). Open field response questions that produce qualitative data about drivers and the SSF (which yields quantitative data regarding suicide drivers) could spur the creation of more exhaustive standardized measures of suicide drivers, such as driver checklists. Such checklists could be easily integrated into theory-driven research.

Along with the refinement and creation of suicide driver measures, suicide driver research would be aided in the use of creative sampling techniques. Ideographic research designs, such as single case experimental designs, to determine the validity of suicide drivers predicting acute suicide risk and suicidal behavior could be effectively incorporated in driver research. This assertion is in line with Barlow and Nock's (2009) calls for ideographic research to further the field of clinical science. Similarly, Davidson, Anestis, and Gutierrez (in press) urge the use of ecological momentary assessment (EMA) in suicide research, stating the methodology is well suited to suicide research where minimizing recall bias is important. The authors also argue that EMA allows for discovering subtle interactions between variables and tracking them over time, increasing the probability of uncovering causal relationships. The real-time assessment of what is driving suicidal desire in participants utilizing driver checklists or the SSF may help demonstrate which potential suicide drivers are most closely linked to suicidal behavior. Due to the ideographic nature of suicide drivers, future research may help pioneer the use of sophisticated and unique sampling methodologies to further advance the prediction of suicidal behavior.

CLINICAL RECOMMENDATIONS FOR SUICIDE DRIVERS

Until such clinically focused research is conducted, practitioners hoping to incorporate the assessment of drivers into their practice could consider doing so in the following general, evidence-based manner. Suicide drivers comprise important elements of both the assessment and treatment of suicidality in the CAMS therapeutic framework. Clinicians and clients collaboratively assess what is driving suicidal behavior in the client and how the client may engage in suicidal coping to manage these suicide drivers. Similarly, clinicians and clients collaboratively engage in treatment planning to create crisis intervention plans and problem-focused intervention plans that focus on the reduction of suicide drivers through evidenced-based clinical interventions or treatment referrals. These elements can help serve as a general framework for assessing and targeting suicide drivers in efforts to reduce future suicidal behavior.

More specifically, direct and indirect drivers can easily be observed in idiosyncratic "stories" about how patients' life events and circumstances led to their suicidal crises (e.g., Michel & Valach, 2011). Such stories should ideally contextualize the experiences specifically associated with patients' suicidal behaviors within their unique psychosocial stressors; allowing patients to relay a narrative that broadly describes their acute and chronic struggles has been suggested anecdotally (Jobes & Ballard, 2011) and shown empirically to improve their perceptions of the therapeutic alliance (Michel, Dey, Stadler, & Valach, 2004). In addition, maintaining this narrative framework allows practitioners to gauge

whether direct and indirect drivers, as described previously, have been adequately identified.

To elicit a patient's suicide narrative, practitioners are encouraged to verbally and nonverbally convey openness for and interest in whatever patients are open to disclosing, as suicidal patients are more likely to convey this information when they believe that the practitioner genuinely cares (Michel & Valach, 2011). Michel and Valach suggested two examples of verbal prompts for this process: "First, I would like you to tell me in your own words how it came about that you harmed yourself" and "I would like you to tell me the story of what led to the suicidal crisis. Just let me listen to you" (p. 71). Such prompting provides patients with a sense of control over the dialogue, and it allows clinicians to note how the patients understand their pain and suffering. However, practitioners may find that they do not have a deep understanding of their patient's unique drivers even after such prompting. If this happens, they are first encouraged to reflect and praise the patient for conveying the information he or she was willing to share. Then, they might consider applying another strategy based on whether they would like further clarification on direct or indirect drivers.

Direct drivers can be assessed further when practitioners have a deeper knowledge about the internal (cognitions, emotions, and physiological sensations) and external (situations) factors associated with acute crises. As such, they might consider providing more structure to the suicide narrative task. For example, patients could be asked to describe the acute crisis as if it were happening in the present moment (e.g., Wenzel et al., 2009) or to begin with the major "decision point" associated with increased risk and to go "backward in time" until relevant experiences have been identified. Such an approach has recently been employed by Bagge, Littlefield, Conner, Schumacher, and Lee (2014), who conducted a study of suicide attempters to try to identify what differentiated the hour prior to a suicide attempt from the other 23 hours leading up to the attempt.

Alternatively, information about direct drivers can be obtained through completing a focused account of a crisis using strategies such as functional analyses, chain analysis (Linehan, 1993; Rizvi & Ritschel, 2013), or diagraming the patient's unique suicide mode (e.g., Rudd, 2000). Indirect drivers can be assessed in greater detail by asking patients to clarify their own general risk factors. Specifically, as suggested previously, while it is helpful to know that a person generally experiences a sense of being a burden, it can be more helpful in clinical work to know what is driving this experience. There are risk assessment measures such as the SSF in CAMS (Jobes et al., 1997) that are specifically designed to examine drivers in this way, although it may be the case that any assessment of risk factors conducted in an idiographic, collaborative, and validating manner could yield this information. In other words, practitioners should not feel wedded to the CAMS approach to conduct this type of assessment.

CONCLUSIONS

Research on suicide risk factors and warning signs has been conducted, and such research has influenced the creation of evidence-based interventions that specifically target suicide risk (e.g., Jobes, 2006; Wenzel et al., 2009). In addition, the growing awareness of these factors has allowed suicide to become a greater focus of public policy and wide-sweeping prevention efforts. For example, the World Health Organization has named September suicide prevention month to reduce the stigma of suicide. In addition, many countries have national suicide prevention crisis lines (e.g., National Suicide Prevention Lifeline; www.suicidepreventionlifeline.org), and at least one major health care system in the United States reduced suicides within their patient population by 75% over a 5-year

period (Coffey, 2007). However, suicide remains a major public health problem, with rates in the United States actually increasing since 2003 (McIntosh & Drapeau, 2014). It is quite possible that suicide rates would be rising much faster if all of these efforts were not in place, but these statistics also demonstrate that there is more work to be performed to prevent the loss of life by suicide.

To determine who is at risk for making a suicide attempt or dying by suicide, decades of empirical research has focused on identifying what risk factors and warning signs most directly predict these outcomes. Results of such studies consistently suggest that the presence of risk factors can highlight whether someone is more likely to engage in suicide-related behaviors at some point throughout his or her life (i.e., "chronic" risk). However, risk factors do not provide information about individuals' imminent risk for suicide attempt or reliably differentiate between those who think about or desire suicide and those who attempt to end their own lives (Klonsky & May, 2014). To overcome this limitation, warning signs for suicide were proposed as a way to highlight people who are at imminent risk for a suicidal crisis; yet, research has also demonstrated that most warning signs similarly lack the ability to identify who specifically is most likely to act on suicidal impulses (e.g., Gunn et al., 2011). Thus, future work designed to understand what variables can more successfully predict suicidal crises is clearly warranted.

We have proposed that one possible part of the solution to this problem is to focus on understanding person-specific drivers of suicide. Research should be conducted to determine whether such drivers can be accurately and reliably assessed. Evidence-based interventions can be applied, or developed, to target categories of drivers in randomized clinical trials. Ultimately, assessment tools will exist to identify suicide drivers that are then linked to the likely most effective interventions for any given patient, equipping providers with the tools they need to move their patients out of acute suicide risk. In the meantime, clinicians are encouraged to rethink their approach to suicide risk assessment and treatment planning. Providers can start by determining what is driving each individual patient's desire to die (i.e., what is the patient's interpretation of the specific trigger for an acute suicidal crisis) and then aggressively treat that issue, or issues, with the best available tools. Advancing the understanding of person-specific drivers of suicide may help move beyond adding to the list of hundreds of suicide risk factors and to make serious advances in saving lives and reducing the tragedy of suicide.

REFERENCES

ANESTIS, M. D., & JOINER, T. E. (2011). Examining the role of emotion in suicidality: Negative urgency as an amplifier of the relationship between components of the interpersonal–psychological theory of suicidal behavior and lifetime number of suicide attempts. *Journal of Affective Disorders*, *129*, 261–269. doi: 10.1016/j.jad.2010.08.006

BAGGE, C. L., LITTLEFIELD, A. K., CONNER, K. R., SCHUMACHER, J. A., & LEE, H.-J. (2014). Near-term predictors of the intensity of suicidal ideation: An examination of the 24 h prior to a recent suicide attempt. *Journal of Affective Disorders*, *165*, 53–58.

BARLOW, D. H., & NOCK, M. K. (2009). Why can't we be more idiographic in our research? *Perspectives on Psychological Science*, *4*, 19–21. doi: 10.1111/j.1745-6924.2009.01088.x

BRITTON, P. C., ILGEN, M. A., RUDD, M. D., & CONNER, K. R. (2012). Warning signs for suicide within a week of healthcare contact in veteran decedents. *Psychiatry Research*, *200*, 395–399.

COFFEY, C. E. (2007). Building a system of perfect depression care in behavioral health. *Joint Commission Journal on Quality and Patient Safety*, *33*, 193–199.

COMPTON, M. T., THOMPSON, N. J., & KASLOW, N. J. (2005). Social environment factors associated with suicide attempt among low-income African Americans: The protective role of family relationships and social support. *Social*

Psychiatry and Psychiatric Epidemiology, *40*, 175–185.

CONRAD, A. K., JACOBY, A. M., JOBES, D. A., LINEBERRY, T. W., SHEA, C. E., EWING, T. D., ET AL. (2009). A psychometric investigation of the suicide status form II with a psychiatric inpatient sample. *Suicide and Life-Threatening Behavior*, *39*, 307–320.

DARKE, S., & KAYE, S. (2004). Attempted suicide among injecting and noninjecting cocaine users in Sydney, Australia. *Journal of Urban Health*, *81*, 505–515.

DAVIDSON, C. L., ANESTIS, M. D., & GUTIERREZ, P. M. (in press). Ecological momentary assessment is a neglected methodology in suicidology. *Archives of Suicide Research*.

FOWLER, J. C. (2012). Suicide risk assessment in clinical practice: Pragmatic guidelines for imperfect assessments. *Psychotherapy*, *49*, 81–90.

GUNN, J. F., LESTER, D., & MCSWAIN, S. (2011). Testing the warning signs of suicidal behavior among suicide ideators using the 2009 National Survey on Drug Abuse and Health. *International Journal of Emergency Mental Health*, *13*, 147–154.

HALL, R. C. W., PLATT, D. E., & HALL, R. C. W. (1999). Suicide risk assessment: A review of risk factors for suicide in 100 patients who made severe suicide attempts: Evaluation of suicide risk in a time of managed care. *Psychosomatics*, *40*, 18–27.

JOBES, D. A. (2006). *Managing suicidal risk: A collaborative approach*. New York, NY: Guilford.

JOBES, D. A., & BALLARD, E. (2011). The therapist and the suicidal patient. In K. Michel & D. A. Jobes (Eds.), *Building a therapeutic alliance with the suicidal patients* (pp. 51–61). Washington, DC: American Psychological Association.

JOBES, D. A., COMTOIS, K., BRENNER, L., & GUTIERREZ, P. (2011). Clinical trial feasibility studies of the Collaborative Assessment and Management of Suicidality (CAMS). In R. C. O'Connor, S. Platt, & J. Gordon (Eds.), *International handbook of suicide prevention: Research, policy, & practice* (pp. 383–400). West Sussex, UK: Wiley-Blackwell.

JOBES, D. A., JACOBY, A. M., CIMBOLIC, P., & HUSTEAD, L. A. T. (1997). Assessment and treatment of suicidal clients in a university counseling center. *Journal of Counseling Psychology*, *44*, 368–377.

JOINER, T. (2005). *Why people die by suicide*. Cambridge, MA: Harvard University Press.

JOINER, T. E., PETTIT, J. W., WALKER, R. L., VOELZ, Z. R., CRUZ, J., RUDD, M. D., & LESTER, D. (2002). Perceived burdensomeness and suicidality: Two studies on the suicide notes of those attempting and those completing suicide. *Journal of Social and Clinical Psychology*, *21*, 531–545.

KESSLER, R. C., BORGES, G., & WALTERS, E. E. (1999). Prevalence of and risk factors for lifetime suicide attempts in the National Comorbidity Survey. *Archives of General Psychiatry*, *56*, 617–626.

KLONSKY, E. D., & MAY, A. M. (2014). Differentiating suicide attempters from suicide ideators: A critical frontier for suicidology research. *Suicide and Life-Threatening Behavior*, *44*, 1–5. doi: 10.1111/sltb.12068.

KRAFT, T. L., JOBES, D. A., LINEBERRY, T. W., CONRAD, A., & KUNG, S. (2010). Brief report: Why suicide? Perceptions of suicidal inpatients and reflections of clinical researchers. *Archives of Suicide Research*, *14*, 375–382.

LEIBETSEDER, M. M., ROHRER, R. R., MACKINGER, H. F., & FARTACEK, R. R. (2006). Suicide attempts: Patients with and without an affective disorder show impaired autobiographical memory specificity. *Cognition and Emotion*, *20*, 516–526.

LINEHAN, M. M. (1993). *Cognitive-behavioral treatment of borderline personality disorder*. New York, NY: Guilford.

MANDRUSIAK, M., RUDD, M. D., JOINER, T. E., BERMAN, A. L., VAN ORDEN, K. A., & WITTE, T. (2006). Warning signs for suicide on the internet: A descriptive study. *Suicide and Life-Threatening Behavior*, *36*, 263–271.

MCINTOSH, J. L., & DRAPEAU, C. W. (for the American Association of Suicidology). (2014). *U.S.A. suicide in 2011: Official final data*. Washington, DC: American Association of Suicidology. Retrieved June 19, 2014, from http://www.suicidology.org.

MCSWAIN, S., LESTER, D., & GUNN, J. F. (2012). Warning signs for suicide in internet forums. *Psychological*, *111*, 186–188.

MICHEL, K., DEY, P., STADLER, K., & VALACH, L. (2004). Therapist sensitivity towards emotional life-career issues and the working alliance with suicide attempters. *Archives of Suicide Research*, *8*, 203–213.

MICHEL, K., MALTZBERGER, J. T., JOBES, D. A., LEENAARS, A. A., ORBACH, I., STADLER, K., ET AL. (2002). Discovering the truth in attempted suicide. *American Journal of Psychotherapy*, *56*, 424–437.

MICHEL, K., & VALACH, L. (2011). The narrative interview with the suicidal patient. In K. Michel, & D. A. Jobes (Eds.), *Building a therapeutic alliance with the suicidal patients* (pp. 63–80). Washington, DC: American Psychological Association.

MOŚCICKI, E. K. (1997). Identification of suicide risk factors using epidemiologic studies. *Psychiatric Clinics of North America*, *20*, 499–517.

MURPHY, G. E., WETZEL, R. D., ROBINS, E., & MCEVOY, L. (1992). Multiple risk factors predict suicide in alcoholism. *Archives of General Psychiatry*, *49*, 459–463.

O'CONNOR, R. C. (2011). The integrated motivational-volitional model of suicidal behavior. *Crisis*, *32*, 295–298. doi: 10.1027/0227-5910/a000120

O'CONNOR, R. C., & NOCK, M. K. (2014). The psychology of suicidal behaviour. *The Lancet Psychiatry*, *1*, 73–85.

RIZVI, S. L., & RITSCHEL, L. A. (2014). Mastering the art of chain analysis in dialectical behavior therapy. *Cognitive and Behavioral Practice*, *21*, 335–349. doi:10.1016/j.cbpra.2013.09.002.

ROY, A. (2003). Characteristics of HIV patients who attempt suicide. *Acta Psychiatrica Scandinavica*, *107*, 41–44.

RUDD, M. D. (2000). The suicidal mode: A cognitive-behavioral model of suicidality. *Suicide and Life-Threatening Behavior*, *30*, 18–33.

RUDD, M. D. (2003). Warning signs for suicide? *Suicide and Life-Threatening Behavior*, *33*, 99–100.

RUDD, M. D. (2008). Suicide warning signs in clinical practice. *Current Psychiatry Reports*, *10*, 87–90.

RUDD, M. D., BERMAN, A. L., JOINER, T. E., NOCK, M. K., SILVERMAN, M. M., MANDRUSIAK, M., ET AL. (2006). Warning signs for suicide: Theory, research, and clinical applications. *Suicide and Life-Threatening Behavior*, *36*, 255–262.

SHNEIDMAN, E. (1985). *Definition of suicide* (pp. 202–213.) New York: John Wiley & Sons.

VAN ORDEN, K. A., LYNAM, M. E., HOLLAR, D., & JOINER, T. E. (2006). Perceived burdensomeness as an indicator of suicidal symptoms. *Cognitive Therapy and Research*, *30*, 457–467.

WENZEL, A., & BECK, A. T. (2008). Cognitive model of suicidal behavior: Theory and treatment. *Applied and Preventive Psychology*, *12*, 189–201.

WENZEL, A., BROWN, G. K., & BECK, A. T. (2009). *Cognitive therapy for suicidal patients: Scientific and clinical applications*. Washington, DC: American Psychological Association.

Manuscript Received: September 12, 2014
Revision Accepted: January 30, 2015